AUGUST 26, 1957
50 CENTS

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# AMERICAN AVIATION

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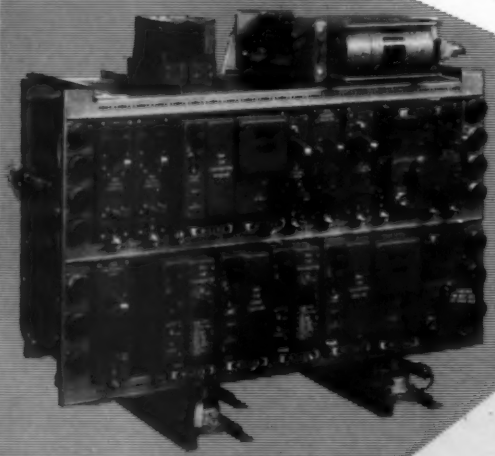

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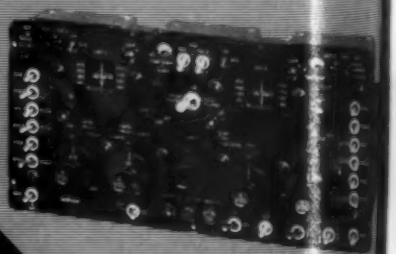

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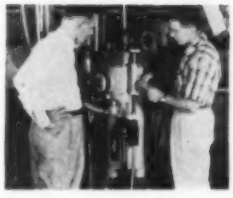
AUGUST 26, 1957—VOL. 21, NO. 7

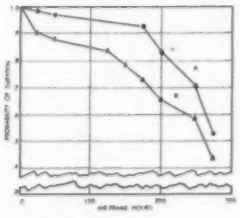
# AMERICAN AVIATION

*WORLD'S LARGEST AVIATION PUBLISHERS*

**Scramble is on in utility jet race**
Four manufacturers have filed for certification of small jet transports, but seven are expected to get into the race. For an analysis of what's going on in this field, see page 31.



**Here's a new tool for hi-temp research**
NACA develops an arc-powered air jet that simulates temperature phenomena up to 20,000°F. For complete story on this plasma jet principle development, see William Beller's story on page 41.



**Human factors is key to reliability**
New ARINC report emphasizes the "stresses" put on electronic gear by personnel, and says radical design changes are needed. Electronics Editor Henry Steier's analysis starts page 43.

**Why did SAS buy the French Caravelle?**
Principal reasons, says International Editor Anthony Vandyk, were its operating features and earlier delivery than nine other transports studied by the Scandinavian airline. Story appears on page 49.

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63,500 Copies of This Issue Printed.

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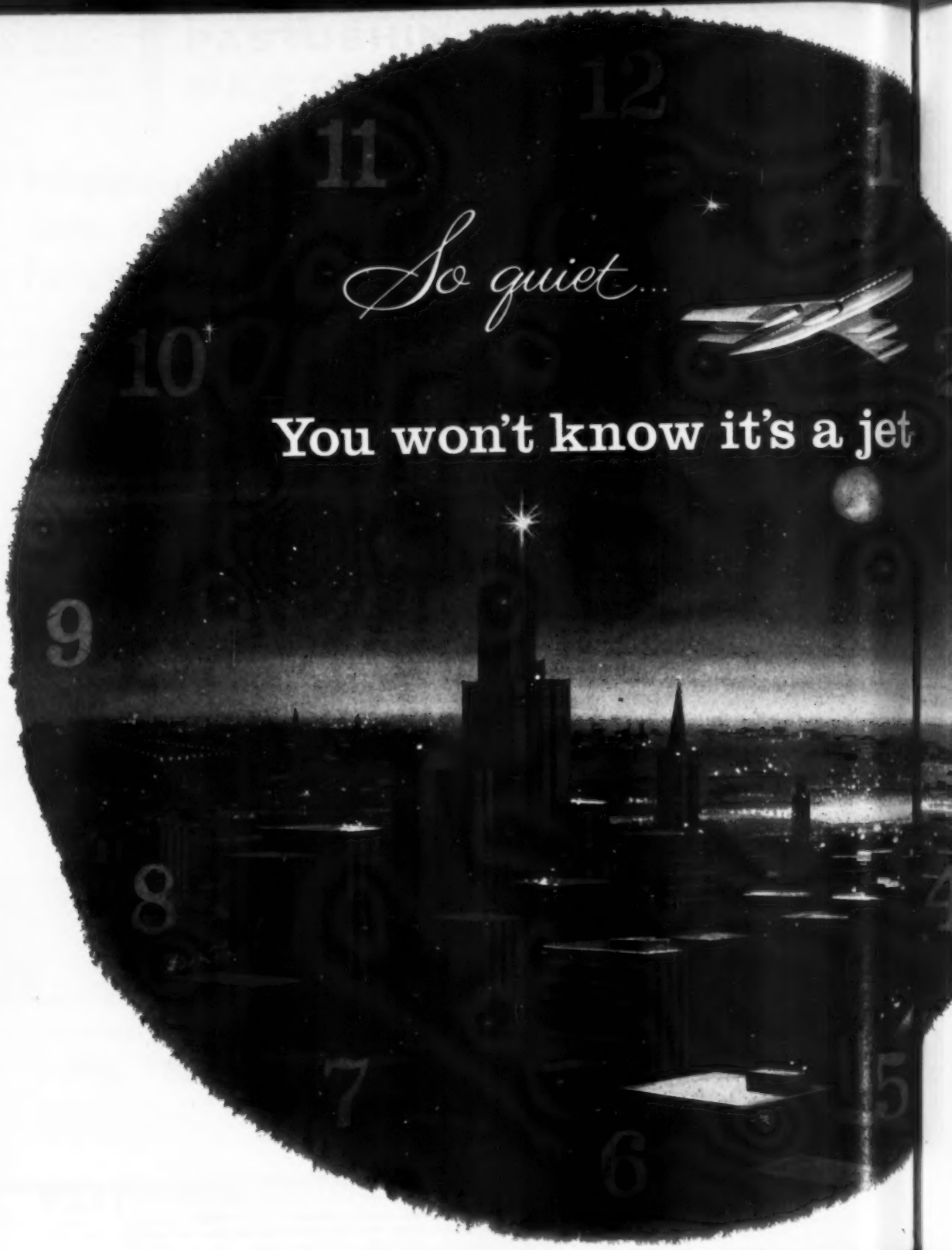
**All signs point to a major realignment of the aircraft engine industry . . .** Pentagon economy and increased emphasis on rocket-powered missiles are two important factors that will determine the future of engine builders during the next two or three years. For a complete analysis of the engine picture see Military Editor Henry T. Simmons' detailed article starting page 29. Other important exclusives in this issue: the third report from the President's aviation facilities planning staff, page 34, and NACA's discovery that the Area Rule may boost jet transport speeds up to 50 mph, page 47.




CURTISS-WRIGHT

# The new CURTISS-WRIGHT ZEPHYR JET ENGINE

Air transportation must become quiet not only for its passengers, but for the communities in which it operates. The development of the Curtiss-Wright Zephyr Turbojet was based on the premises: 1 – that its technical excellence must provide a worthwhile performance improvement; 2 – that its advances must be sound in the final analysis from the economic point of view, and; 3 – that it must have a high order of public acceptance, not only from the viewpoint of the passenger, but the communities in which the airport is located and over which the airplane is operated. Moving airports further out of town with its attendant expense and the inconvenience of time lost in additional city to airport transportation is not the answer.

Curtiss-Wright Corporation has completed sufficient testing with the "Zephyr" to warrant the statement that the jet engine transport can be quiet and have a high order of public acceptance.

**New Testing Procedure**

The testing procedure for the Zephyr is new and novel. Curtiss-Wright discarded the standard jet engine test cell – a mass of concrete, steel, sound absorption, water silencing, etc. – and transferred the testing of the Zephyr to an open air test stand in which the engine is run with no silencing or sound absorption equipment under a specification calling for a minimum of noise, as well as a minimum of fuel consumption, just as the engine would run when it is in an airplane at the airport.

This outdoor testing equipment consists of two mobile vehicles; one on which the engine is mounted for tests; the other housing the control room and instrumentation required to measure thrust, fuel consumption and other equipment. Through the use of these mobile vehicles, the Zephyr is constantly being tested and demonstrated at airports and at off-highway locations to record and analyze its noise levels under idling, taxiing and full throttle conditions. This practical method of testing enables engineers and technicians to change new noise suppressing devices being developed and other equipment quickly and with ease.

The engine may be held at a given set of conditions so that technicians and observers can listen to, record and analyze noise levels for extended periods of time, and, while they are doing this, engine operating conditions can be changed instantly for purposes of demonstration. This method is preferable to listening to an airplane passing overhead where the noise is reduced or muffled, where the time for measuring and recording the volume of noise is limited and where it is difficult to fix the distances and conditions with any degree of accuracy.

Curtiss-Wright plans to demonstrate the mobile testing unit and the Zephyr engine at airports and other locations in the U.S. A request has been received to demonstrate the unit at a major airport in Europe.

**Quieter Than Piston Engine**

A jet engine transport can be quieter than a piston-engine airplane. For example, Curtiss-Wright has been able to minimize the compressor whine of the jet engine. This is the lesser in decibels of the two principal sources of noise from a jet engine, but, in a practical sense, its frequency and characteristics are something like a siren and more objectionable to some people than the jet noise which is of a lower frequency. Curtiss-Wright has also reduced the jet exhaust noise to acceptable levels because basically the engine is designed so that the mass of air passing through the jet to produce thrust is moving at a lower speed than that common to engines developed for military use at supersonic speeds. For the foreseeable future airlines will fly subsonically, and, therefore, there is no need for using supersonic speed jet engines, with their disadvantages, for jet airline operation.

**Broad Research Program**

Engine noise suppression, while the major element, is only one phase of the Curtiss-Wright program to lower noise levels for aircraft and airport communities. The mobile control room used in the Zephyr tests is lined with Curon, a new sound absorbing, multi-cellular, foamed material developed by Curtiss-Wright. This enables engineers to conduct concurrent tests of new methods of soundproofing aircraft passenger cabins. The same Curon can play an important role in absorbing ground noise at airports where jet and other aircraft are operated. For example, a curtain of Curon hung between runways and buildings will substantially reduce noise at the building. And Curon, in the form of wall tiles, ceiling and floor coverings, can further absorb sound and result in quieter air terminals and offices than ever before.

These are but a few of the technological developments of the Curtiss-Wright Corporation designed to make the introduction of jet airliners to the world airways quieter, more comfortable and economically sound. Others will follow.

*This advertisement is published in response to the public interest in the Zephyr Jet engine reflected by numerous inquiries received from individuals and governmental authorities at every level.*

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# There's new ease of travel for you on United—world's largest user of airliner radar

Several years ago United Air Lines foresaw the need of radar on commercial airliners, and worked with Radio Corporation of America in the development and testing of airborne radar equipment.

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For you as an air traveler, this is an important new benefit. Our pilots who operate United's radar-equipped aircraft are very enthusiastic about the results. They tell me that radar represents the greatest single advance in comfort and schedule dependability in the history of United Air Lines and the airline industry.

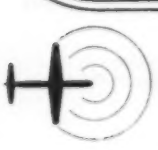
With radar in the cockpit, each Mainliner pilot now gets a clear picture of the weather up to 150 miles ahead, even through clouds or darkness.

Today, with radar, we fly through the smoothest corridors of the weather pattern, with more assurance of on-schedule performance and greater comfort.

Radar represents one of the many ways in which United Air Lines is continually making its service more comfortable, more dependable and more attractive to the increasing millions of travelers who are turning to air as the modern, easy way to travel.

W. A. Patterson

PRESIDENT
UNITED AIR LINES



**WORLD'S LARGEST RADAR FLEET**

UNITED AIR LINES

## PERSONAL VIEW

# Is Irishman Durfee Too Timid?

REJECTION by the CAB recently of a six percent fare increase for seven airlines was a paradox.

There is more solid stature on the CAB now than there has been in many years. The last three appointments have been capable men who have the ability to think. Although only one out of the present five has actually ever had to rustle up a payroll and manage a business, there is no disputing the fact that the caliber of board membership is much higher than it's been for quite a long spell even before the disastrous Rizley drought.

So why, then, did the CAB bungle to such an extent in delaying much-needed action on fares?

It wasn't because of the facts. Airline load factors have been dropping steadily. Costs have been rising rapidly. Equity financing is at a standstill. Aircraft manufacturers are deeply concerned about forthcoming payments for new equipment now on order. Banks and other financial institutions have lost faith, not in the airlines, but in the regulatory agency mandated by Congress, to develop and maintain a healthy industry. Several major carriers are facing serious trouble.

So what happened?

We think it's a combination of circumstances. For one thing the airlines themselves made a poor showing in presenting their cases without emphasis on equity financing. (Too many lawyers involved in too much legalistics.) Another factor was the vast amount of misinformation and anti-business (socialist) ideologies crusading within the presently uncontrolled and unguided staff (a la the Jack Rosenthals, et al). Still another factor was just plain ignorance of the gravity of the present situation.

But perhaps a more important key is timidity. We have considerable faith in Chairman Jim Durfee. He is still new on the job but he's set a pretty admirable record on the learning curve. He's new to Washington, but he is still inclined to be cowed or bullied by minority groups in Congress, notably the greatest self-seeking minority bloke of all, the chief poohbah of all special pleaders, the great Mr. Emanuel Celler of Brooklyn. Mr. Durfee is not timid when he is on familiar grounds; in fact he loves a fight. But we think Mr. Durfee has permitted himself to be cowed, pushed and bullied, without any real grounds whatever. This is a pity. Quite a pity, indeed, and rather an odd spot for an Irishman to find himself on.

When it comes to courage, the real credit on the CAB must go to Chan Gurney, the former Senator from South Dakota, who has more guts and more sound businesslike convictions than a subsidized merchant steamship full of bureaucrats.

Mr. Gurney voted for a fare increase, the only vote which a knowledgeable gent could possibly make. He said he believed the fare increase "is mandatory under the Board's responsibility to develop, maintain and keep a healthy civil air transport industry." He said the denial "puts U.S. civil aviation in a critical financial position" and the majority of the CAB "has not in my opinion met its responsibility; in fact the overall need is so urgent, their decision may be calamitous to the industry, some parts of which may be damaged beyond repair because of further delay in meeting this emergency problem head on." Mr. Gurney ain't afraid of nobody.

Irishman Durfee now has a challenge worthy of his mettle. We hope his learning curve takes another leap upward. In fact we hope Chairman Durfee decides that the entire Board should hear the passenger fare investigation without subjecting the industry to tedious and unnecessary hearing procedures before an examiner. Mr. Chairman, are you listening, or are you still letting Manny Celler keep you from exercising the responsibilities of your high office?

---

# Airspace Control Moves Ahead

THE CAB has taken a bold and courageous step in its proposal to amend the Civil Air Regulations to tighten the control of airspace.

The step would effectively restrain the military services from arbitrarily blocking out restricted or danger areas whenever they felt like it. It would delegate to the Administrator of Civil Aeronautics the power to designate restricted areas and to revoke and modify such restrictions as he deems necessary to assure the safety of planes in flight.

It is considered a certainty that the military will make itself heard fully and loudly next month when the proposal comes up for final determination. It is possible that the military will bring enough pressure to bear to keep the CAA Administrator from exercising control for areas off the airways.

But it is good for CAB to step into the forefront and exercise the prerogative of regulating airspace handed to it by Congress. The initiative was well taken. As for CAA, the present administrator, Jim Pyle, is capable of exercising discretion and good judgment in making full allowance for all justifiable military requests. Unless the proper chain of command for use of airspace is established firmly, real trouble lies ahead. We commend CAB for its forward move.

**Wayne W. Parrish**

# OFF THE DRAWING BOARD...INTO BEING

The future is being shaped today on the drawing boards at Bell Aircraft. Important developments in such fields as guided missiles, aircraft, inertial guidance, nucleonics, rocketry, electronics and helicopters are advancing steadily.

The results of Bell's continuous research programs and progressive, straight-line thinking are reflected in such current realities as the GAM-63 Rascal, a long range strategic air-to-surface guided missile built for the USAF—the automatic Aircraft landing system, for the Navy, Air Force and commercial application—the XH-40, first helicopter with turbine power—and the recently unveiled X-14, a new type aircraft that takes off and lands vertically but flies like a conventional jet.

With such major developments to its credit, a keenly creative, active organization like Bell Aircraft works confidently toward future contributions both to national defense and civilian industry—and to proving again and again that the surest way to get an idea off the drawing board and into being is to assign the task to Bell.

BELL Aircraft corp.

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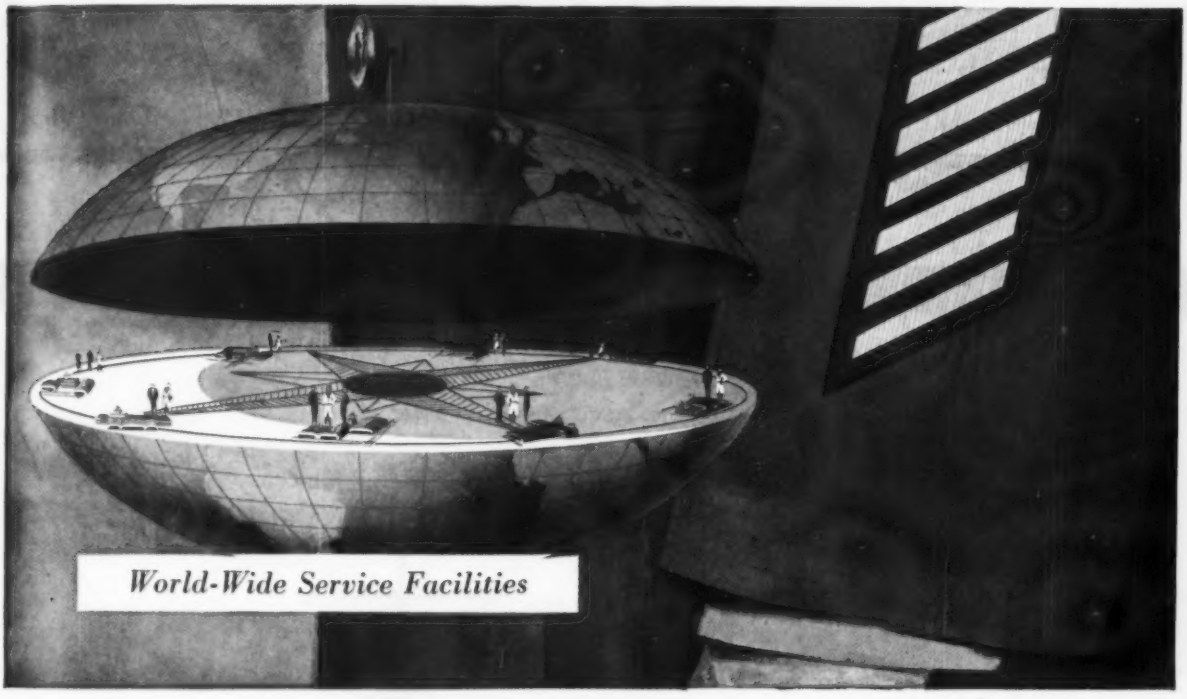


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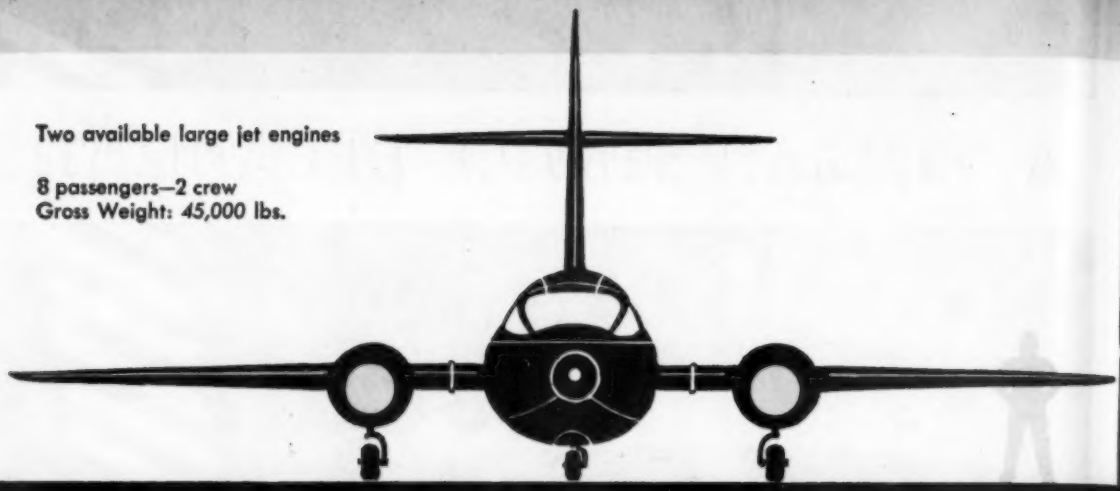
Gross Weight: 45,000 lbs.



Four Small Jet Engines

8 passengers—2 crew
Gross Weight: 26,000 lbs.

Two Small Jet Engines

4 passengers—2 crew
Gross Weight: 16,000 lbs.

# SMALL JET ENGINES...

# CHAMPION WEIGHT REDUCERS

The new breed of high-performance, lightweight, small jet engines coming to life will broaden the horizons of jet aircraft design, performance. versatility and utility.

*Best of all, the new small jets will make possible lighter, less costly aircraft with performance to match the big planes of today. With power/weight ratios as high as 8 to 1 and long range potentials of more than 10 to 1, the small jets may power lightweight fighters, basic and advanced jet trainers, transports of half the size with proportionate savings in weight and cost. As the new airframes shrink, their performance and especially their versatility and utility expand.*

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# LETTERS

## On serving alcohol aloft

To the Editor:

It is difficult to understand your reasoning in the editorial, entitled "Those Anti-Alcohol Bills," in the July 29, 1957, issue of AMERICAN AVIATION. You seem to be on all sides of the fence at once. Even more confusing is your effort to infer that a very small group of people are supporting the move to ban the service of alcoholic beverages on board aircraft.

You seem to have forgotten that only six airlines make liquor available to passengers and that a number of these have publicly stated that they did not desire to continue the practice but are only doing it for competitive reasons. A number of airlines still completely refuse to serve liquor on board their airplanes and prefer to stand on principle even though it may place them at a competitive disadvantage. A number of the six who do make liquor available sell it rather than give it away, and the one whom you characterize as "barbarian" for placing it on the meal tray does so to discourage excessive consumption. All in all, we are wondering just exactly who is for the service of alcohol on board airplanes as contrasted to your statement that "a very small group of people" are against it.

There is no question but what the service of alcohol in a confined space where an individual is captive for extended periods and subjected to a strange environment creates serious safety and social problems. When such problems arise, they are the direct responsibility of the pilot in command of the aircraft who is legally charged with providing for the safe conduct of the aircraft and its passengers. If a social problem arises aboard the aircraft, the pilot in command must finally cope with it. To do so may create serious safety problems.

There is no doubt as to the authority of the federal government, state governments, and municipalities to regulate the place and conditions under which alcoholic beverages may be sold or consumed. We do not sell or consume alcohol in theaters, public schools, churches, or on transportation vehicles except in separate bars. It has always been an accepted prerogative of lawmakers to regulate the place of the sale and consumption of alcohol in any form. Without exception, such regulation has prohibited the consumption of alcohol in areas where a hazard would be created or undesirable social situations develop.

We certainly concur with your view that there are other ways of handling the alcohol problem than Congressional legislation. But if it is a matter of growing up, then aviation is still the "lusty infant" about which you wrote some time ago. Many years ago when abuses in the service of alcohol first appeared, we urged self-discipline on the airlines. Nothing was done. As a secondary alternative, we urged regulation by the Civil Aeronautics Board. Nothing was done. The abuses continue and the problem is now before the Congress.

We are forwarding for your information a copy of our statement before the Congressional Committees in support of that legislation. We do not think that you can catalog us as a "special pleader" in this cause. We do, however, have a selfish interest. It is our prime responsibility in flight to provide for the safe operation of the aircraft which must include the social conduct of the passengers. We cannot carry out that responsibility with an unlimited supply of alcohol being given away or sold in the passenger compartment. *CLARENCE N. SAYEN, President, Air Lines Pilots Assn., Chicago, Ill.*

*EDITOR'S NOTE: As far as safety and liquor are concerned, all evidence indicates it's the passenger who's either well loaded before boarding, or who carries his own bottle on board, who is the menace. Enacting a federal law prohibiting the serving or selling of any alcoholic beverages in the air will do no more to remove the aforementioned menace than an earlier federal law did to stop drinking. In fact a federal law will only make things worse, if history is any criterion. Is safety REALLY the issue if common sense prevails? Aren't there other factors pushing the bill?*

## Post-mortem on visit

To the Editor:

We were intrigued to see, amongst the "Sidelights" in the July 15 issue of AMERICAN AVIATION, some prominence given to our treatment of the always welcome visitors whom we entertain in our Directors' dining room at Acton. It was not quite clear whether the writer of this paragraph was actually complaining of the treatment!

Although the freight lift which he mentions is one of the largest in the country, it is also one of the oldest and must be quite unsafe to bear the weight of anyone who has sampled Napier hospitality. Apart from being thus solicitous for our guests' welfare, we also offer them (weather permitting) a fine view of the Works, and indeed of a large area of London.

In case any of our American friends should conclude that lunching at Acton is an engagement to be avoided on a rainy day, let me hasten to add that street level can also be reached by a highly respectable staircase inside the building. Wet or dry, therefore, livers can be shaken down before the afternoon's work begins. *R. M. HILARY, Commercial Manager, D. Napier & Son Limited, Commercial Division, Acton, London, England.*

## Bouquet for Saint

To the Editor:

I say "Amen" to Sam Saint's fine article on Ernie Cutrell's work which appeared in your issue of July 29. There is little that I can add except that we in CAA agree wholeheartedly with it, and feel honored that Ernie is still helping us in this complex lighting problem, for we value his advice and counsel in this difficult field.

I for one am delighted that Ernie's many years of efforts are being recognized not only by the ALPA but by others, and I would like to just add one more "well done" for an outstanding job. *JAMES T. PYLE, Administrator, Civil Aeronautics Administration, Washington.*


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**If this unique combination of skill, experience and almost unlimited capacity can help YOUR production, we invite you to send for our team of consulting engineers. They will travel to any part of the USA. They will offer DELIVERY ON TIME and at competitive prices.**

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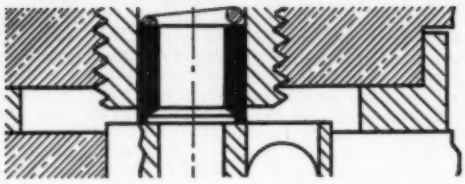

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You'll be given constantly fresh, challenging assignments. Remuneration will be substantial, with many benefits that are unexcelled in the entire industry—health and life insurance, college educational reimbursement plan, regular vacations plus extra year-end vacations with pay, and a generous retirement plan.

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Producers of Scorpion F-89 Interceptors and Snark SM-62 Intercontinental Missiles

5-A-86

## WHEN—WHERE

### AUGUST

**Experimental Aircraft Assn.,** annual Fly-in and convention, Curtiss-Wright Airport, Milwaukee, Aug. 30-Sept. 1.

### SEPTEMBER

**Royal Aeronautical Society and IAS** 6th International Aeronautical Conference, Folkstone & London, Sept. 1-15.

**SBAC annual air show,** Farnborough, England, Sept. 2-8.

**Annual OX5 Club convention,** Hotel Phillips, Kansas City, Sept. 7.

**Aircraft Div., American Society for Quality Control,** annual conf., Mark Hopkins Hotel, San Francisco, Sept. 9-10.

**USAF world-wide conf.** of flying safety officers, Arrowhead Springs Hotel, San Bernardino, Calif., Sept. 9-13.

**IATA annual general meeting,** Madrid, Sept. 9-14.

**ICAO Communications Div.,** 6th session, Montreal, five weeks starting Sept. 10.

**USAF-aircraft industry conference** on safety education, Santa Barbara, Calif., Sept. 17-19.

**Pratt & Whitney operations maintenance forum,** Airwork Corp., Millville, N. J. Sept. 19-20.

**ASME fall meeting,** Hotel Statler, Hartford, Conn., Sept. 23-25.

**Composite and joint meeting** of IATA traffic conference, Miami, Sept. 24.

**Air Freight Cartage Conference,** Chicago, Sept. 24-25.

**Aviation Spark Plug & Ignition Conf.,** Secor Hotel, Toledo, Sept. 24-26.

**Airwork-Pratt & Whitney annual forum,** Airwork Corp., Miami Villas, Miami, Sept. 27.

**SAE Aeronautic meeting,** Aircraft Production forum and Aircraft Engineering Display, Ambassador Hotel, Los Angeles, Sept. 30-Oct. 5.

### OCTOBER

**National Airports Conference,** University of Oklahoma, Norman, Oct. 2-4.

**National Business Aircraft Assn.,** 10th meeting and forum, Denver, Oct. 2-4.

**International Northwest Aviation Council,** annual convention, Palliser Hotel, Calgary, Canada, Oct. 6-8.

**National Electronics Conference and Forum** on electrical research, development and application, Hotel Sherman, Chicago, Oct. 7-9.

**Triennial Inspection** of the NACA Lewis Propulsion Lab., Cleveland, Oct. 7-10.

**Annual Airport Development and Operations Conference** sponsored by N. Y. State Bureau of Aviation, Onondaga Hotel, Syracuse, Oct. 8.

**International Union of Aviation Insurers,** annual general meeting, Amsterdam, Holland, Oct. 8-11.

**Society for Experimental Stress Analysis** national fall convention, El Cortez Hotel, San Diego, Oct. 9-11.

**National Noise Abatement Symposium,** Armour Research Foundation, Sherman Hotel, Chicago, Oct. 10-11.

**ASTA convention** and world travel congress, Madrid, Spain, Oct. 13-20.

**National Assn. of State Aviation Officials,** annual meeting, Sun Valley, Ida., Oct. 16-18.

**Canadian IRE Convention-Exposition,** Automotive Bldg., Exhibition Park, Toronto, Oct. 16-18.

A-25

# Beware of the Snark!

**The nation's first intercontinental missile . . . the Air Force's Northrop Snark SM-62. Equipped with a nuclear warhead, the Snark is a so-called air-breathing missile which travels in the earth's atmosphere. Its compact design presents a smaller target for radar, interceptors, or anti-aircraft missiles.**

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**The pilotless bomber is powered by a Pratt-Whitney Aircraft J-57 turbo-jet engine equipped with a Holley compressor bleed governor. It flies in near-sonic speeds above the weather over the longest range yet possible by a missile in the free world today.**

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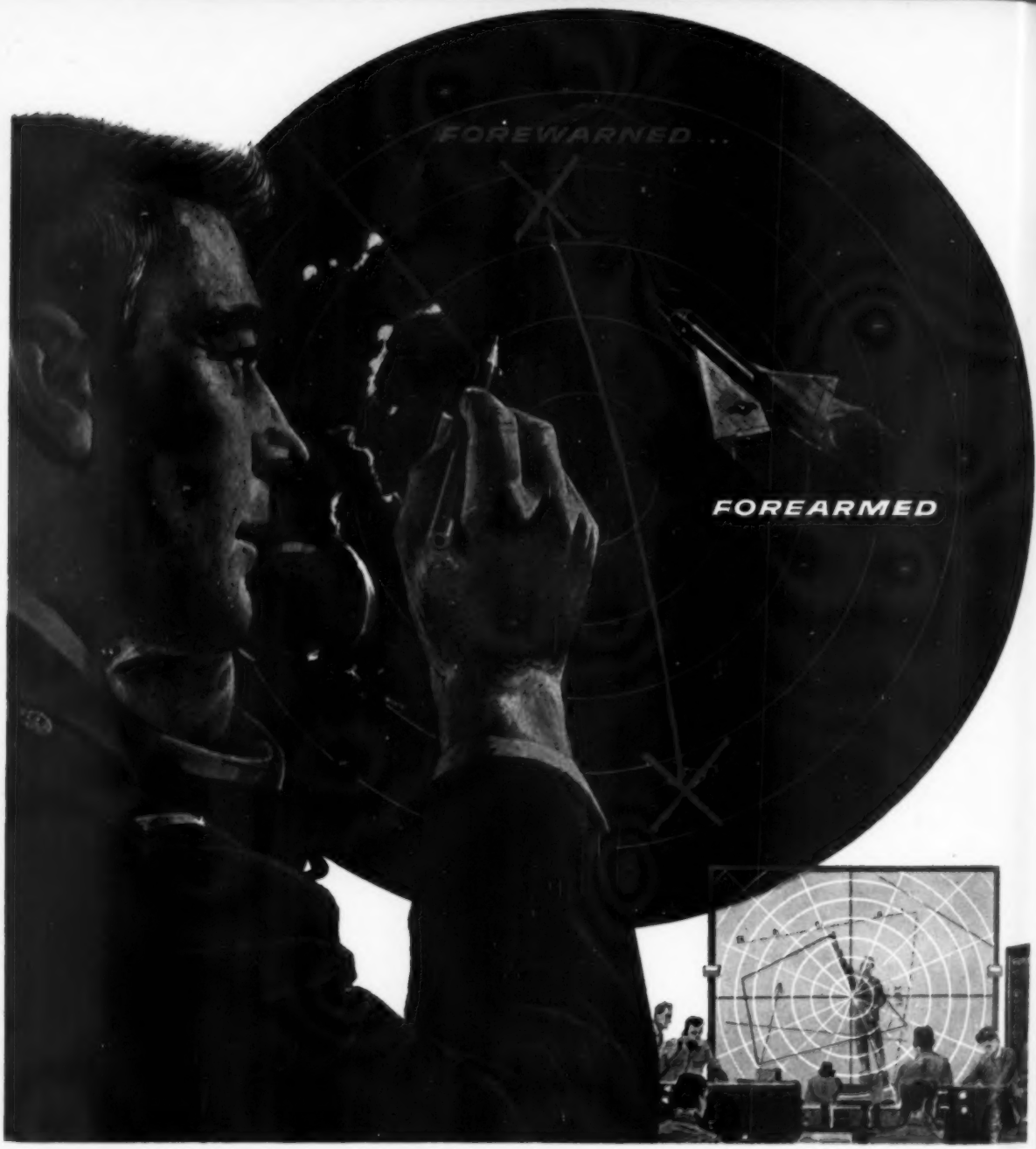


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## CONVAIR

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# AIRTRENDS

***All signs point to decision on single intermediate range ballistic missile*** by this fall, before preparation of fiscal 1959 budget. But it will set forth overall guidelines on airframe-engine combination only, with details to be worked out from there. Single system is expected to incorporate Thor airframe and combination of subsystems of both missiles yet to be determined. Firings of both will continue into next year, with data applied to final merged weapon.

***Army's Redstone Arsenal, however, definitely will not go out of business*** with demise of Jupiter. Improved 200-mile range missile is under consideration with evidence that Defense may relent on restrictions in November roles and missions memo. Also, Defense Secretary Wilson shows signs of more open-minded thinking on proposed 750-mile Army ballistic missile—though only as a future prospect.

***Sweeping revision by Defense Department in overall missile program*** will be ready by mid-fall. Each missile project is under microscopic evaluation to determine relation to total Defense program, regardless of service affiliation. Defense missile czar Holaday's recommendations are likely to be approved in toto. Both numbers and types of missiles will be reduced, according to Secretary Wilson. Objectives, dictated by spending ceiling and economy wave, are to eliminate duplicating, short-lived and questionable weapons. "We know that we don't need nor can we financially bring in all the missiles under development to the quantity stage the services would like," Wilson told recent press conference.

***Industry is taking Air Force officials at their word in encouragement*** of joint bids by pairs or groups of firms on new development contracts. Most recent example unites Collins Radio Co. and Temco Aircraft Corp. in a bid for an important countermeasures program. During recent Air Force Assn. meeting, AF Asst. Secretary Richard E. Horner termed this approach one of the most satisfactory compromises toward alignment of industry capability and capacity with project needs as USAF launches overall program reduction.

***Air Force may drop the top priority now*** assigned the Titan ICBM program. Decision would not affect scope of present contracts, but would mean that Martin, Aerojet, Bell Laboratories, American Bosch-Arma, Avco and other Titan contractors would have to cut personnel 5% and operate under overtime payment restrictions.

***Bid by Aircraft Owners and Pilots Assn. to reopen Tacan squabble*** appears doomed to failure. AOPA has asked Congress to investigate alleged switch of position by airlines in Air Coordinating Committee which, it says, indicates carriers no longer support Vortac decision to the extent that they have an admitted requirement for distance measuring equipment.

*Problem facing AOPA is lack of understanding* on Capitol Hill of such highly technical issues. Two years ago, when DME/Tacan dispute was raging, only Congress was big enough to get to the bottom of the controversy. But it failed then and there's little reason to suspect it could improve on that record now. Consensus is this situation won't change until Congress hires its own technical consultant, one not dependent on military business for a livelihood.

***Turbine engine manufacturers have redoubled their design efforts*** in hopes of coming up with new engines which will attract military interest (See story, p. 29). Some have invested substantial amounts of their own funds in these new projects, but have encountered long delays in getting positive decisions from military services. While manufacturers do not object to supplying their own funds, they do feel they deserve the consideration of prompt military decision on their proposals.

# DIGEST

## Defense orders reduction in progress payments; AF asks employment cuts to keep within budget ceiling

The flow of Pentagon economy decrees continued unabated this month, but there were signs that the military services have succeeded in mapping out —if not announcing—the bulk of the hardware cuts necessary to meet the $38-billion expenditure ceiling for the current fiscal year.

Principal Defense Department actions included:

*Reduction in progress payments by five percentage points—from 75% to 70% of total costs, and from 90% to 85% of direct labor and material costs only.*

*Air Force request to all its contractors except those engaged in the ballistic missile programs to trim total employment 5% by October 31.*

The reduction in progress payment allowances on price-type contracts was ordered by Defense Secretary Charles Wilson in Directive No. 7800.5, dated Aug. 10. The action will have the effect of requiring a contractor to invest a greater portion of his own money in an item of hardware during the production cycle, but will not affect his total payment at the time the contract is completed.

"These reduced percentages shall apply to new contracts, new procurement effected by supplements, amendments or modifications of existing contracts, definitive contracts superseding letter contracts, instruments effecting new procurement under basic or master agreements, and to all supplements, amendments or modifications made on or after 1 September 1957, which affect or provide for progress payments," the directive said.

The directive also provided that contracts containing "optional clauses" regarding the amount of progress payments will be revised to conform to the lower rates after consideration of all factors involved and due notice to the contractor.

The only exception to the terms of the new directive was allowed for small business concerns. "For contracts with small business concerns, contracting officers are authorized to provide, so long as reasonably necessary, progress payment percentages up to 75% of total costs or 90% of costs of direct labor and material," the directive said.

A Defense Department official estimated that about $4 billion in progress payments are currently outstanding, and that the new directive could gradually reduce this figure by about $265 million, or 7%.

Besides making contractors more cost-conscious by requiring them to put more of their own money into materials and work-in-process, the directive will also force contractors to increase their commercial borrowings, thus relieving the government to some extent of the task of borrowing additional funds. This is deemed desirable because the $275-billion ceiling on the national debt is expected to put the government in a tight financial squeeze next January when revenue collections are thin.

Thus any step which would tend to replace government borrowings with commercial borrowings by contractors will help the government get "over the hump."

"Every $100 million we save on progress payments saves another $200 million to $300 million in the end-item program," a high Air Force official said. He explained that the progress payment reduction will make it possible to spread the Air Force's expenditure cutback over two years instead of concentrating it in one year. "It is to the industry's long-term advantage to suffer through this adjustment," he declared.

Probably at least as important to the aircraft industry as the reduction in progress payments was the Air Force request to cut total employment 5% by the end of October. The USAF estimated the new reduction, plus other personnel cuts already announced by the companies, will still leave total aircraft industry "somewhat above the level of 1956."

According to the Aircraft Industries Association, the industry's first quarter 1956 employment averaged 767,000, while its average for the entire year of 1956 was 804,000. Current employment is now a little less than 900,000, and it is possible that the new action, plus previously announced cuts, will trim this figure to less than 800,000 in the very near future.

AIA saw no difficulty in achieving the 5% personnel cutback through normal attrition, but said it is doubtful the reduction can be achieved by the end of October unless the Air Force promptly announces all the changes in its procurement program necessitated by the Administration's expenditure ceiling.

The USAF spending ceiling for fiscal 1958, previously set at $17.6 billion, was increased to $17.9 billion this month. The increase of $300 million was achieved by reducing the Army's spending ceiling by more than $200 million and wiping out entirely a contingent expenditure planned by the Office of the Secretary of Defense. But the over-all ceiling of $38 billion remains in effect.

Wilson's decision to increase the USAF ceiling was praised by one high Air Force official. "That $300 million saved about $1 billion worth of program—about $1 billion worth of end items over the next two or three years," he said. He added that the increased ceiling is an important "cushion" for the aircraft industry because it will permit continuance of production programs which might otherwise have to be eliminated entirely.

The Navy's spending ceiling was also increased slightly, to $10.4 billion. To meet the figure, the sailors **must** trim their present program by approximately $600 million. Though a smaller dollar figure than the $900 million program curtailment required of the Air Force, the Navy cutback nevertheless represented a deeper percentage bite in its program than the reduction the Air Force must institute in its own procurement plans.

The Navy has ordered cutbacks or stretch-outs in five aircraft programs to provide some of the savings it must realize during the current fiscal year. None of its missile programs were

*Sketch of Navaho missile*

ARTIST'S CONCEPT of North American SM-64A Navaho. The 5,000-mile range missile project has been curtailed by Defense Department, but firings of completed vehicles are being carried out to obtain data. Rocket booster is built by North American's Rocketdyne Division and ramjet engines are by Curtiss-Wright.

affected by the reductions, and all of the adjustments in aircraft programs were described as "minor."

These include a "small downward revision" in the Martin P6M-2 SeaMaster jet bomber (probably only one aircraft, reducing the company's order from 18 to 17 production models), a "slight stretch in schedule" for the Douglas F4D-1, a "curtailment and planned slowdown" for the Douglas A4D-2, a "minor stretch-out in delivery schedule but no reduction" in the McDonnell F3H-2, and a "small reduction and stretch-out" in the Chance Vought F8U-1.

The fact that no change was ordered in the Navy's missile production programs, and that no announcement of Air Force missile program cutbacks has been made, gives special significance to remarks by Secretary Wilson at a recent press conference suggesting that a detailed scrutiny of the entire military guided missile program is now under way and that it will result in new cancellations.

It is apparent that the Pentagon has a pretty clear idea of the types of missiles and the quantities which will have to be curtailed. This was indirectly confirmed by Mr. Wilson when he told a reporter he believes the current Defense economy campaign is "fairly well mapped out now."

This view was shared by a high Air Force official, who said he thinks the USAF has decided upon all the procurement cutbacks necessary to trim its fiscal 1958 spending to $17.9 billion. To date, the USAF has announced reductions in four fighter programs—the F-101, F-104, F-105 and F-106—but has said nothing of missiles. It has been reported unofficially, however, that the airmen may also have to reduce the Falcon air-to-air missile and the Matador surface-to-surface weapon.

There is also the matter of military development programs. It appears likely that a cutback has been ordered in the Air Force's WS-125 nuclear aircraft program, but no official announcement has been made other than a statement by United Aircraft Corp. that its Pratt & Whitney Aircraft Div. may curtail or drop its nuclear propulsion work for the USAF because of the economy drive.

Other cutbacks in development may affect the USAF's ICBM program and force a choice between the USAF Thor and Army Jupiter IRBM weapons earlier than previously expected. While it appears likely that any necessary development cutbacks have already been decided upon by the Air Force (and the Defense Dept.), no official light has been shed on the subject despite persistent inquiries from both the trade and general press.

## House passes bill guaranteeing loans to local airlines up to $5 million per carrier; measure faces Senate test

The House passed and sent back to the Senate legislation that would authorize government guarantees up to 90% on aircraft loans for the local service industry.

The legislation varies in specific details from the Senate-passed bill. But seasoned observers predicted that these differences would be worked out before adjournment-hungry legislators retire.

The loan proposal, which encountered objections on the floor of both branches, also survived the opposition of Commerce Secretary Sinclair Weeks.

Specifically, the eagerly-sought measure will pave the way for CAB to establish an office to oversee the handling of government-backed private loans. As passed by both houses, it covers 25 local and territorial carriers.

Loans would be limited to $5 million per carrier, and extend no longer than ten years. Senators originally made the proposed law applicable only to new aircraft, or those certificated after the date of passage. They excluded helicopter lines; but their colleagues in House blanketed in four of these carriers.

On the Senate side Commerce Committee Chairman Warren Magnuson (D-Wash.) moved promptly to defeat a bid to kill the bill reconsideration. The appeal was led by Sen. Frank Lausche (D-O.), who charged that the bill would open the way for other requests for federal aid.

Identical objections were raised in the House by economizer John Taber (R-N.Y.), but the bill, on a roll call vote was endorsed 242 to 94.

### Other airline aid bills advance

Another major piece of legislation aimed at easing airline re-equipment woes progressed through the legislative mill. The House okayed the capital gains bill and sent it to the Senate.

Victory for its backers came when an expected floor fight failed to develop.

Rep. John Heselton (R-Mass.), who led a battle a year ago to kill similar legislation, abruptly dropped his objections.

Assurances that a controversial retroactive clause would be dropped mollified the Massachusetts lawmaker. The section was killed in committee; and on the floor it was asserted the move would eliminate the possibility of the bill creating a "windfall" for a few carriers.

Capital gains legislation, generally, will allow carriers to reinvest the proceeds from the sale of aircraft equipment in new planes without subsidy penalties.

Other provisions of the revamped bill limit coverage to aircraft equipment only and require the carrier to alert the CAB of the capital gain in writing. Its fate in the Senate was less predictable as lawmakers neared the wire in a race for adjournment. Two alternatives faced Senators. They could either take the House bill as is, or wait for a report from their own commerce committee.

### 'Equipment trust' gets House nod

The third phase of "package" legislation to bolster re-equipment plans sailed through the House. Passed over once on the consent calendar, the so-called "equipment trust" proposal cleared the hurdles in the lower branch and went to the Senate.

Simultaneously, the Senate Judiciary Committee stamped its approval on the Senate version of the bill that would make lending institutions preferred creditors on aircraft loans.

Outlook last week was for prompt Senate approval of Sen. John Butler's (R-Md.) wording—or adoption of the House-passed bill.

## New Defense head McElroy: fast man on decisions

Next Secretary of Defense Neil H. McElroy, 53 in October, will bring to the Pentagon a reputation as a man who is rough on careless or sloppy material, one who likes the facts and makes up his mind quickly once he has them.

McELROY

McElroy is 6 ft., 4 in. (he was varsity basketball center at Harvard '25), dresses conservatively, moves fast, impresses people by his combination of quick thinking and relaxed, friendly manner.

The future Defense chief joined Procter and Gamble in 1925 as a mail clerk at $100 a month in the firm's advertising department. He had intended to return to Harvard to add a master's degree to his AB in economics but made such an impression on his P&G superiors that they asked him to stay and take on added responsibilities.

He has held the positions as promotion department manager, advertising and promotion manager, vice president in charge of advertising, and vice president and general manager, before being elected president in 1948.

McElroy says that he knows he isn't "jumping into a feather bed" by taking the Pentagon post. "But if you have the feeling you can help some, you accept. National defense is the Number One concern of this country. Whether you call it national defense or world peace, it is one and the same thing."

McElroy is married (wife's name Camilla) and has three children—Nancy Sue, 21, a Bryn Mawr graduate; Barbara, 19, wife of Air Force Lt. David Dimling; and Malcolm, 14.

## BRIEFS

### Manufacturing

**E. R. (Pete) Quesada** received unanimous Senate confirmation to serve as chairman of the Airways Modernization Board. He will continue as Special Presidential Aide for Aviation Facilities. President Eisenhower has signed the bill giving the Airways Modernization Board legal status as an independent agency.

**Marquardt Aircraft Co.** has received a $12-million Air Force contract for production of additional ramjet engines for the Boeing Bomarc missile. Total orders now stand at $30 million.

**Radioplane Co.** has been merged into Northrop Aircraft and will be operated as a Division of the company. Radioplane had been a wholly-owned subsidiary of Northrop.

**Lockheed Aircraft Corp.** is planning to offer a turboprop freighter version of the Super Constellation with Allison 501 engines in Electra power packages. Aircraft would be available under $2.5 million and would offer a 55,000-lb. payload.

**Convair Division** of General Dynamics has named J. G. Zevely director of contracts and commercial sales to boost commercial sales of the 880 jet transport and 440 twin-engine propeller transport. Company has established a military relations department under T. G. Lanphier, Jr., vice president and assistant to the president.

**Col. Peter Beasley,** who died August 9, was buried August 23 at Arlington National Cemetery. He was vice president of de Lackner Helicopters, Inc., and former president of Detroit Aircraft Co.

**Kaman Aircraft Corp.** conducted the world's first pilotless helicopter flight June 30 at Bloomfield, Conn., according to a company announcement.

**James H. Smith, Jr.,** former assistant Navy air secretary, has been named by President Eisenhower to head the International Cooperation Administration succeeding John B. Hollister.

**Defense Department** has ordered a 10-15% cut in military petroleum in fiscal 1958. Cut will be heavy in avgas and Navy special fuel oil.

**Beech Aircraft Corp.** has listed its new Model 95 Travel Air four-place, twin-engine executive aircraft at $49,500.

### Financial

**Pan American World Airways** reports a net income of $3,013,000 for the second quarter of 1957. This is without subsidy and includes no gains from disposal of aircraft. PAA's net of $3,828,000 last year at same time included $2,300,000 in subsidy under the mail rate then in effect. Operating revenues for 1957's second quarter were $81,744,000, a record high.

**Fairchild Camera & Instrument Corp.** earned $266,000, or 56¢ a share, during the first half of the year. Net sales and rentals were $19,956,000.

**United Aircraft Corp.** reports sales of $604,014,634 and earnings of $25,747,810, or $4.80 a share for the first six months of the year.

**Western Air Lines** realized a net profit of $1,473,310, equal to $1.78 a share for the first half of the year. Operating revenues were $19,642,761.

**Seaboard & Western Airlines** reports earnings of $661,779 on revenues totaling $11,991,000 for the first half of the year.

**General Dynamics** reports net income of $18,479,197 on sales of $726,081,490 for the first six months of 1957. Sales were 75% up from last year's first half.

**Boeing Airplane Co.** reports net earnings of $16,502,000 on sales of $651,890,419 for the first six months of the year. Backlog June 30 included $697 million in commercial 707 orders.

**Norden-Ketay Corp.** reports sales of $13.8 million and earnings of $201,000 for the first six months of the year. The figures represent increases of 35% and 20%, respectively, over last year's first half.

**Curtiss-Wright Corp.** and its subsidiaries report sales for the six months ended June 30 amounted to $313,341,963, compared with $279,147,270 for the same period a year ago. Income this year was $20,712,890, up slightly from year ago's $20,452,133. Backlog June 30 was $579,912,000.

### Transport

**Northeast Airlines** marked its 24th anniversary August 11. Original routes covered 180 miles, assets were two second-hand Stinsons and $10,000.

**National Safety Council** has named 38 supplemental and large irregular air carriers as winners of its Aviation Safety Award for completing 1956 without a fatality.

**Cecil Meadows,** 54, died recently. He was Kern County, Calif., Airport director and a former president of the American Association of Airport Executives.

**United Air Lines** will build a $10-million passenger terminal on a 27-acre site at New York International Airport's "terminal city."

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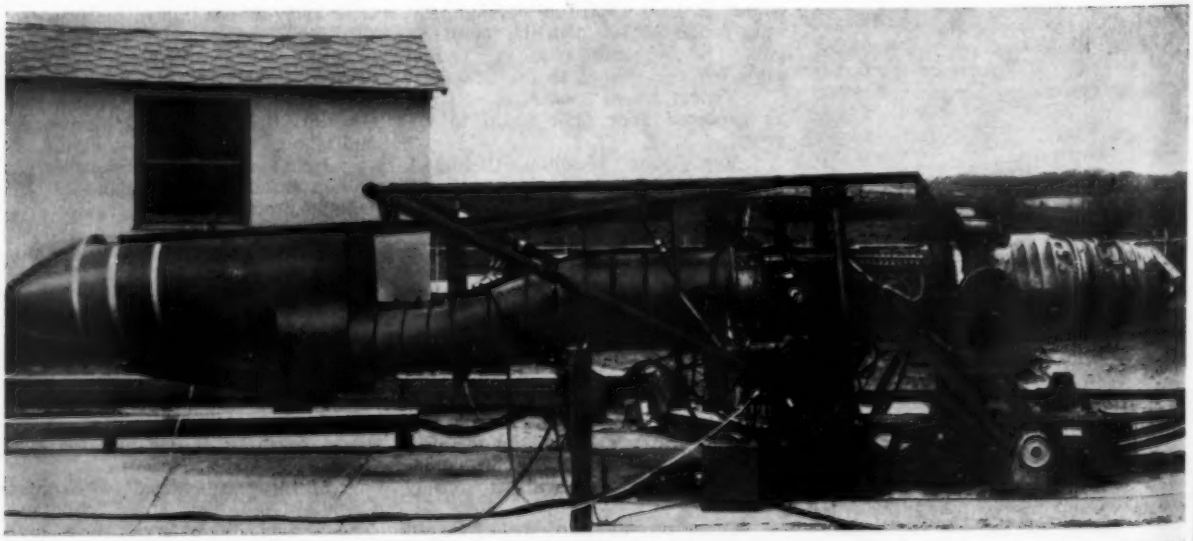
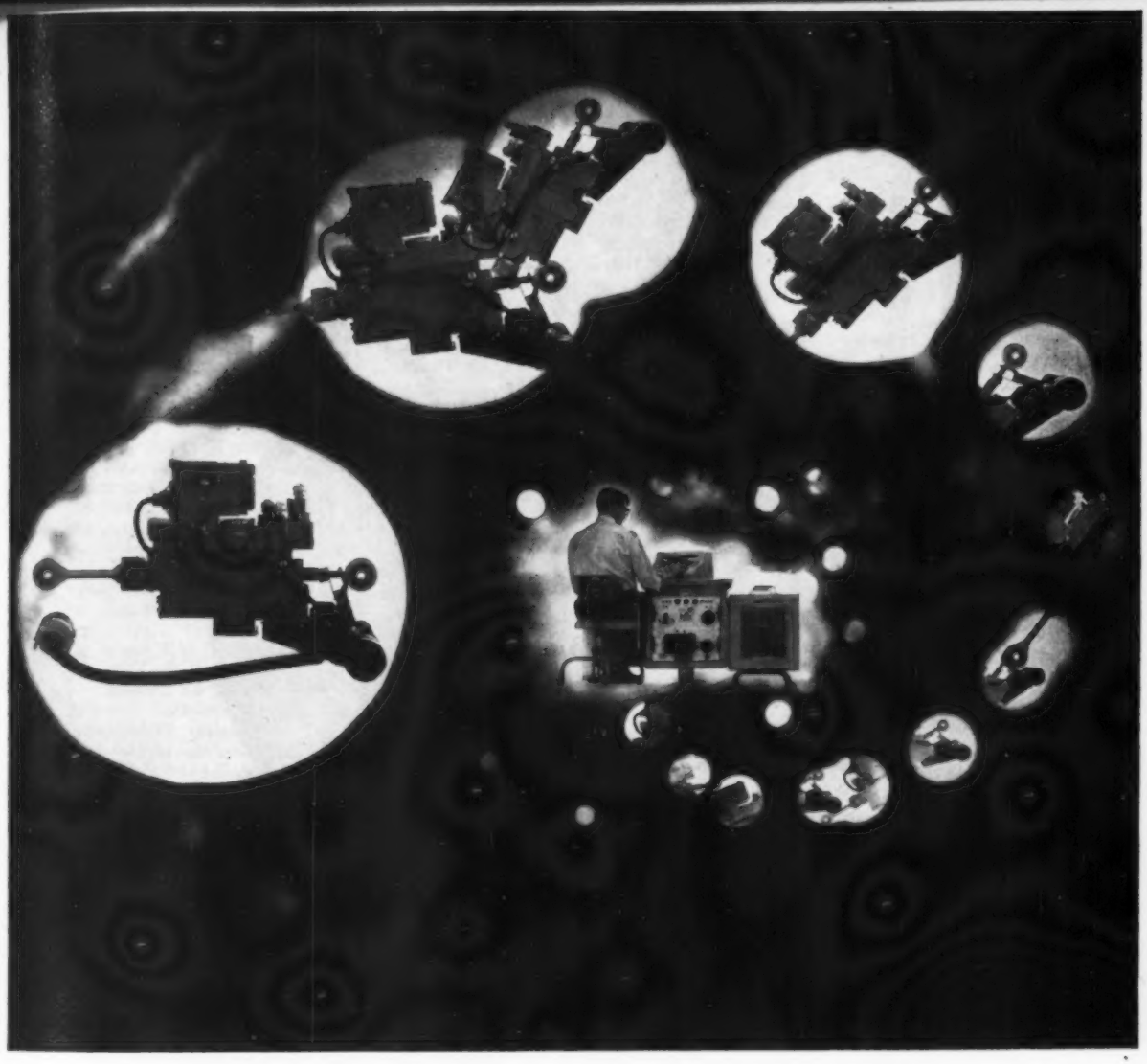
*J34 tested for use in Navy's North American jet trainer*



COMPATABILITY of Westinghouse J34-WE-46 engine and inlet duct of North American T2J-1 all-purpose trainer was studied on outdoor rig at Westinghouse Flight Test Center, Olathe, Kan., NAS. Completion of first trainer is slated for late this year.



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# SPOTLIGHT

Biggest, and certainly one of the most amazing aircraft engine orders in history has been made by Howard Hughes for the 33 Boeing 707s for TWA. A total of 300 jet engines, 60 J57s and 240 J75s, has been ordered from Pratt and Whitney. In fact Hughes has so many delivery positions tied up that he is permitting Boeing to buy a few. One report says Hughes charges a $5,000 premium for every second engine taken by Boeing.

**Army has decided to go ahead with Fairchild's four-prop VTOL testbed, but will substitute a single GE T58 turboprop engine for the four piston engines originally planned. Aircraft uses the deflected slipstream principle, as does the Ryan two-prop testbed. Work on the Fairchild project was suspended because windtunnel tests indicated the original design would be underpowered.**

Bell XV-3 convertiplane is scheduled to go to NACA's full-scale windtunnel at Ames Aeronautical Laboratory, Moffet Field, Calif., for closer study of its aerodynamic behavior. Army, which is financing the project, believes that basic mechanical instability caused loss of the other XV-3 several months ago.

**Results of Army's recent series of parametric design studies on 250-eshp turboshaft engines indicate that a feasible powerplant and transmission system can be obtained in this power category at a total weight of less than 100 lbs. It is not clear, however, whether Army will have funds to start hardware development this fiscal year.**

Air Force shortly will let a development contract for a new air-to-surface missile to be powered by either the Fairchild J83 or GE J85. Designated WS-131B, new weapon will be carried by the B-52G. Design proposals in a classified competition are under evaluation. However, North American Aviation is expected to be winner, particularly in light of the Navaho cancellation.

**Navy and Air Force Tactical Air Command are standardizing on MA-2 probe-and-drogue equipment for purpose of refueling each other's fighter aircraft.**

Navy has made approximately 200 installations of statistical accelerometers in late-type aircraft to measure stress loads during assigned squadron operations. Philosophy behind this is an attempt to provide a finite service life for each type aircraft from a standpoint of fatigue. When certain stress levels have been exceeded a given number of times, it is planned to reassign the aircraft to other missions.

**Normal work-force turnover would take care of a large percent of current industry employment cutbacks, but only in numbers. Problem is that attrition occurs primarily in lower grades, whereas the retrenchment cuts across the board, including skilled and highly skilled workers.**

Republic Aviation delivered 7,883 in its F-84 series to the Air Force: 2,711 F-84F Thunderstreaks, 715 reconnaissance version RF-84F Thunderflashes and 4,457 F-84 Thunderjets.

**Bell Aircraft reportedly is suggesting a 1,200-hour overhaul period for its H-13 transmissions and longer life for other major components. Hiller is said to be talking about similar improvements in its H-23 components. If they materialize, these improvements could substantially curtail Army's interest in a new two-man helicopter.**

Recent "mail delivery" flight of a Jupiter missile looks like another gain for Army's air-bearing gyro enthusiasts. A technical war has been raging on the relative merits of air-bearing vs. floated gyro guidance systems, with Army's German scientists backing the former. Ramo-Wooldridge has been trying floating gyros for missiles.


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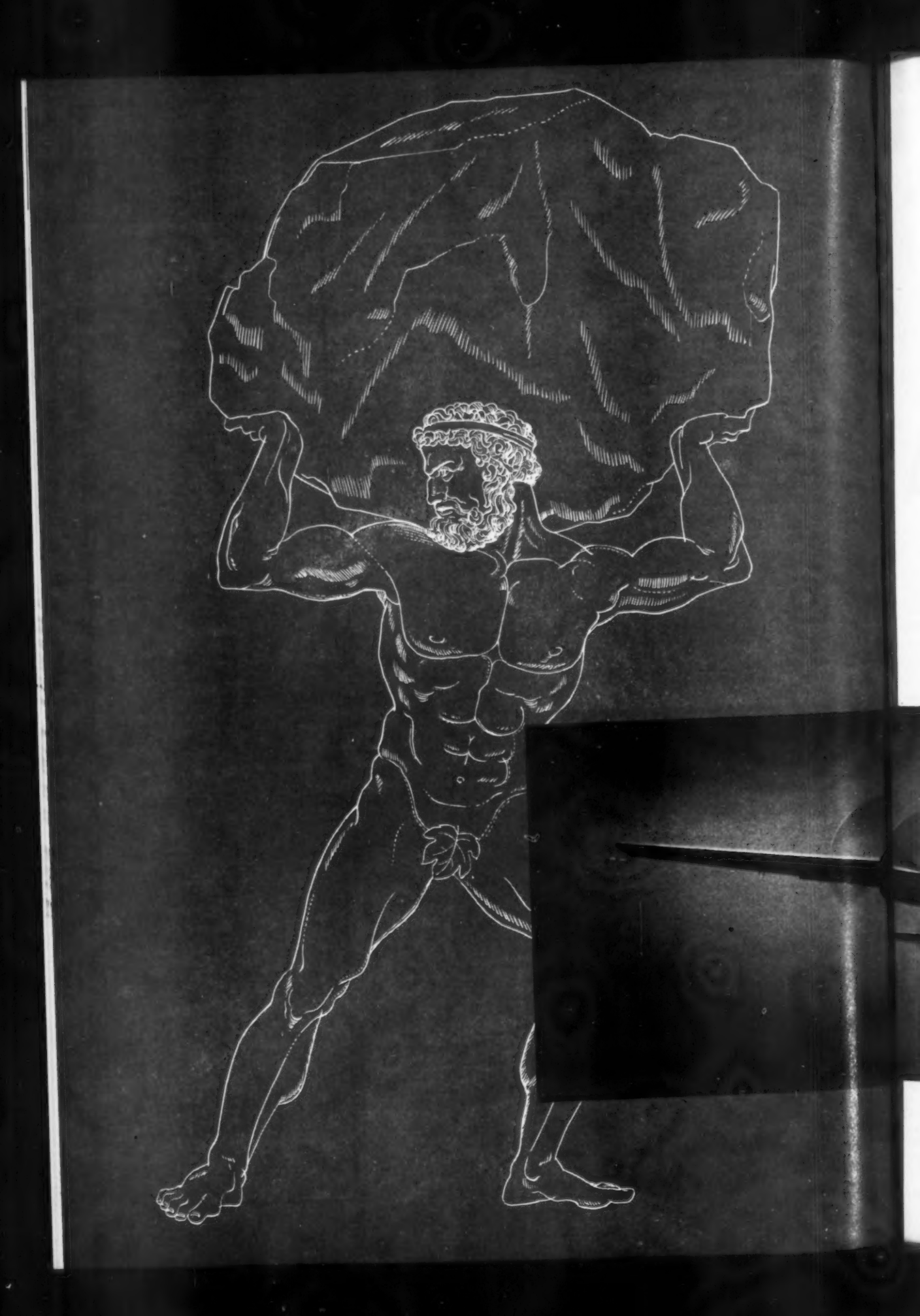

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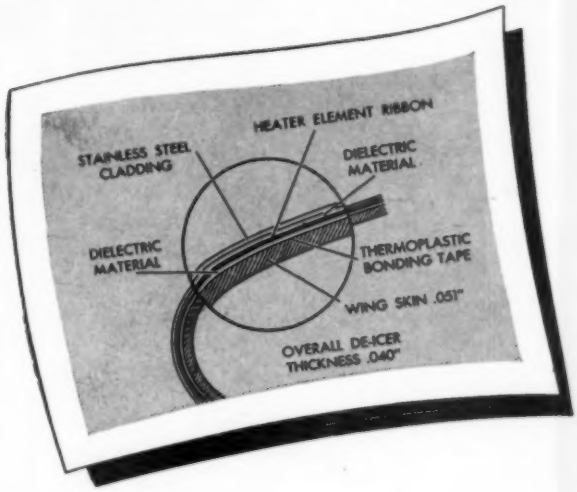


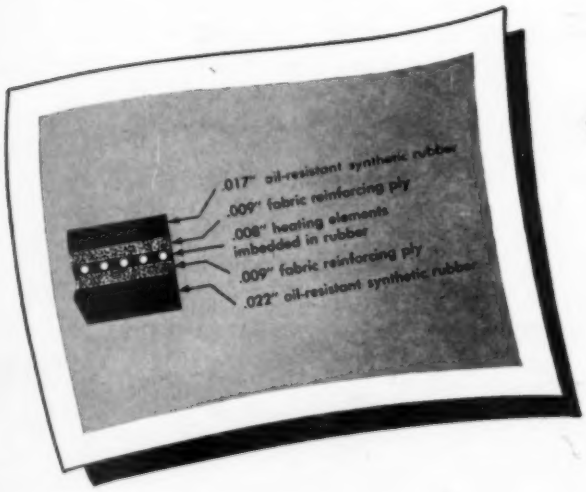
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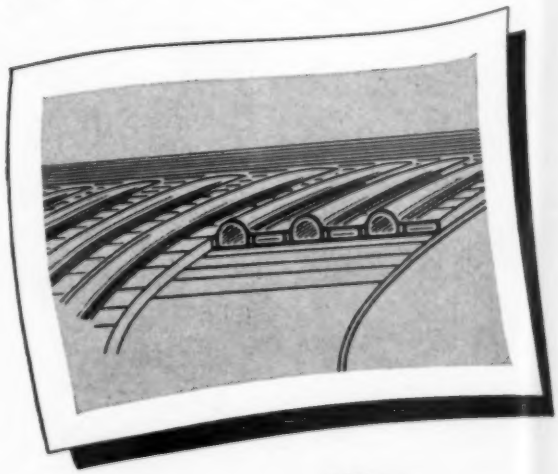

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AUGUST 26, 1957—VOL. 21, NO. 7

AMERICAN AVIATION

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# Engine picture . . .

## *Pentagon economies, increased emphasis on rocket-powered missiles indicate the industry is in for a major realignment*

**by Henry T. Simmons**

BARRING DRASTIC CHANGES in U.S. military procurement plans, the American gas turbine industry appears headed for a major realignment during the next two or three years.

This outlook is the direct result of increasing military reliance upon guided missiles which are not restricted to "conventional" gas turbine powerplants. It has been accelerated to some extent by the recent wave of Pentagon economies which have forced cutbacks in key aircraft and missile procurement programs.

Before he retired from his post as Director of Procurement and Production for the USAF Air Materiel Command, Maj. Gen. David H. Baker gave this description of the future facing the engine makers:

"The decline in (Air Force) programs . . . is . . . associated with the shift to missiles. Fiscal year 1956 dollars of 1.5 billion will fall off to less than one billion, or a reduction of one-third of the fiscal year 1956 volume. This is caused by a greatly reduced volume of jet engines with a partially offsetting increase in rockets and ramjets. In terms of numbers of turbojet engines, there will be a 40% reduction in installation of jet engines alone for aircraft and missiles in the next few years."

The thinning market for aircraft powerplants conforms with an expected drop of about 50% in military procurement of manned aircraft weapon systems during the next several years.

While airframe makers will be able to cushion their loss somewhat by building missiles, there is little possibility that the gas turbine manufacturers can successfully adopt the same tactic. Rocket and ramjet engines power the bulk of the new missiles, and the gas turbine producers for the most part have devoted only a small portion of their effort to these powerplants.

Nine companies presently provide almost all the gas turbine propulsion systems used in U.S. aircraft and missiles. Five of these have been traditionally regarded as the nation's major prime aircraft engine suppliers. They are the Aircraft Gas Turbine Div. of General Electric Co., Allison Div. of General Motors Corp., Pratt & Whitney Aircraft Div. of United Aircraft Corp., Aviation Gas Turbine Div. of Westinghouse Electric Corp., and the Wright Aeronautical Div. of Curtiss-Wright Corp.

Based on the volume of military development and procurement work which will be available in the next several years, it appears almost inevitable that some of these companies will either drop their gas turbine operations entirely in favor of other activities or drastically reduce the scope of their present gas turbine work.

An examination of the current development and production assignments held by the five companies clearly indicates that two of them—GE and Pratt & Whitney—hold virtually all the outstanding contracts.

GE produces large aircraft turbojet engines at Evendale, Ohio, and smaller turbine powerplants at Lynn, Mass. Its J79 variable stator engine is now in volume production at Evendale and is slated for the Lockheed F-104, Convair B-58, North American A3J attack plane, McDonnell F4H fighter, Grumman F11F-1, and the Convair 880 jet transport, as well as the Chance Vought Regulus II missile. Some slowdown in this work is anticipated as a result of the recent Pentagon economies.

The company's 1,000-eshp T58 turboshaft engine is now in "production status" at Lynn, but GE has yet to receive a large production contract for it. The powerplant was designed principally for helicopter utilization, but it is also finding application in some of the vertical take-off aircraft now under development by the Army and Navy.

Of greater importance to GE's future as a turbine engine manufacturer is its development work. The company's 2,000-pound-thrust J85 is in advanced development at Lynn and holds the promise of many applications in aircraft and missiles. Either the J85 or Fairchild's competing J83 will power such machines as the Northrop T-38 supersonic trainer, the new "off-the-shelf" combat readiness trainers and utility transports (see story, p. 31), and a variety of new missiles like the Fairchild Goose, McDonnell Quail and WS-131B.

Other GE development work includes the 2,600-eshp T64 engine for helicopter and aircraft propulsion, and a new Mach 3 turbojet which will be needed for the Air Force's proposed long-range interceptor and WS-110 chemical bomber.

Pratt & Whitney also enjoys a relatively strong position in the engine industry. In production at East Hartford, Conn., is the J57 for the Boeing B-52 bomber and KC-135 tanker, the North American F-100, McDonnell F-101, Convair F-102, Chance Vought F8U-1, Douglas A3D and F4D, the Northrop Snark intercontinental missile and other weapon systems. P&W will also build commercial versions of the J57 for the Boeing 707 and Douglas DC-8 jet transports.

(Also producing the J57 is the Aircraft Engine Div. of Ford Motor Co. at Chicago. There are signs that Ford may not build the P&W J75, as originally planned, but will continue J57 work for some time.

P&W is also building the T34 turboprop engine for the Douglas C-133 transport and the 15,000-pound-thrust J75 twin-spool engine which will power the Chance Vought F8U-3, Martin P6M Seamaster, Republic F-105 and intercontinental versions of the Boeing and Douglas jet transports.

In P&W's military development pipeline is the J52, a small edition of the J57, and the extremely powerful J58, a Mach 2.5 engine. The J52 may power the successor to the Navy's A4D attack bomber, now in the competition stage, as well as certain new missiles. The J58 will be developed at P&W's

new West Palm Beach, Fla., facility, and may find application in a successor fighter for the F8U-3, now under development.

The military outlook for Curtiss-Wright, Westinghouse and Allison is uncertain in comparison to the well-entrenched positions of GE and P&W.

Westinghouse apparently has not yet aroused military interest in its J54 turbojet and its principal prospect at the moment lies with its J34 which was selected recently to power the North American T2J trainer, now under development for the Navy.

Allison is building the T56 turboprop at Indianapolis for the Lockheed C-130 transport and is in production with a commercial version of this powerplant for Lockheed's Electra. It is also building J33 engines at a very slow rate. Its large J89 turbojet development was sharply curtailed earlier this year when USAF selected GE in the competition to develop the Mach 3 turbojet, and no other substantial military-financed development work is known to be under way.

Curtiss-Wright is producing the J65 engine for the Navy at Wood-Ridge, N. J., as well as the R3350 piston engine for commercial and military use. The company's J67, based on the Bristol Olympus, has not been adopted by the military nor has its T49 turboprop. It was scheduled to provide ramjet engines for the Navaho, but lost that assignment because of the project's cancellation.

C-W is known to be working on a turbo-fan research project for the military, as well as a dual-cycle propulsion system for Republic's experimental XF-103. But it is too early to determine whether these projects will lead to substantial military investment in development and production.

Roy Hurley, C-W president, has voiced strong confidence in the commercial possibilities of the TJ38 twin-spool turbojet, described as the product of a wedding of the J67 and the Olympus. Bristol-built versions of this engine will be available to airframe manufacturers in mid-1958, and C-W will be able to supply its own model in 1959, according to Mr. Hurley.

Unlike the commercial jet engines offered by General Electric and Pratt & Whitney, the TJ38 will have no U.S. military support. Mr. Hurley does not feel this will hamper sale of the engine because he regards it as "fully developed." But the question still exists as to whether an American gas turbine producer, with or without licensing arrangements with foreign companies, can survive in the jet engine business without military support for its products.

The staggering cost of jet engine development is probably the major reason why gas turbine manufacturers have not attempted to develop new and different powerplants exclusively for commercial use. The Aircraft Industries Association has estimated that future jet engines may cost as much as $150 million to develop, exclusive of production tooling-up costs.

Military estimates run even higher. One Air Force engine expert figured it will cost an average of $250 million to bring a new engine from concept through a 250-hour test.

The commercial transport market by itself is far too small to support such enormous development costs. Any transport utilizing a privately-developed jet engine would simply price itself completely out of the competitive picture.

Thus the plight of those gas turbine companies lacking current military business and future military prospects would appear to be quite serious. Industry sources feel that the present trend toward concentration of military gas turbine work in GE and P&W continues, it will be difficult for Allison, C-W and Westinghouse to continue to survive in the turbine field without drastically reducing the scope of their operations.

An interesting feature of the problem confronting the gas turbine producers is its implications with regard to the nation's "mobilization base." During the Korean War and in the years immediately following it, much of the government's industrial defense planning was aimed at assuring a broad mobilization base, with numerous sources capable of turning out critical defense items like jet engines on short notice.

According to this policy, special efforts should be made to spread around the available work among all producers, even at the risk of some increase in unit costs, on the theory that four or five sources operating at a low level represent much greater potential capacity than two or three sources operating at optimum rates.

Although no government official, either in the Pentagon or in the Office of Defense Mobilization, has ever said that the broad base policy has been dropped, it appears obvious that it has been tacitly but completely abandoned

## *USAF Century Series in family portrait*

FIVE MEMBERS of Air Force's Century Series of fighters on parking ramp at Air Research and Development Command's Flight Test Center, Edwards AFB. Clockwise from bottom are: F-104, F-100, F-102, F-101, and F-105.

as far as the aircraft industry is concerned.

If this view is correct, the future of those members of the gas turbine industry not favored with military business is most uncertain. But the outlook is not completely black, and no high Pentagon official will agree that a sweeping shake-out of half the country's major turbine producers is inevitable.

One high Air Force official told AMERICAN AVIATION: "You can't overlook the ingenuity of these companies. Certainly they have a serious problem on their hands, but maybe they will get some important contracts in the next six months which will completely reverse the outlook."

Said another prominent USAF official: "The Air Force is not in the business of putting companies out of business. We have a free economy, and if a company is clever enough about its technical approach on an engine, it's going to get a play."

One particularly bright spot in the gas turbine picture is the small turbojet-turboprop engine. The strong market for these powerplants has been amply demonstrated by the experience of the smaller producers in the industry —Continental Aviation and Engineering Corp. with its J69, Lycoming Div. of Avco Manufacturing Corp. with its T53 and T55 turboshaft engines, and Fairchild with its 1,000-pound-thrust J44 and 2,000-pound-thrust J83 development.

The Army may soon order a development competition for a 250-eshp turboshaft engine to power such vehicles as a two-man helicopter, an aerial jeep, vertical take-off aircraft and small conventional aircraft. The extremely high thrust-to-weight ratios expected from an engine in this power category could open the door to revolutionary advances in aviation.

Another factor which may indirectly assist the gas turbine producers is increasing military resistance to the idea of providing the designer of a new item with the facilities he needs to develop and produce it.

According to a recent speech by Assistant USAF Secretary Richard Horner (Research and Development), the Air Force will encourage designers of promising new equipment, including engines, to work out licensing or similar arrangements with established producers wherever possible in order to avoid the cost of constructing new facilities.

This new policy could be of great importance to the gas turbine producers who now face a slim future. For some, it might mean development and production of radically different propulsion systems like rockets and ramjets, or multi-cycle powerplants like turbo-ramjets or turbo-rockets.

# Lockheed takes lead in jet utility transport race

by Lois C. Philmus

THE OPENING GUN in the race to win the USAF's unique off-the-shelf jet utility aircraft competition was fired last week as Lockheed Aircraft Corp. became the first contender to roll out a prototype. First flight is scheduled for early September, putting Lockheed ahead of its competitors in producing hardware for the multi-engine contest.

To date, four manufacturers have filed application with CAA for type certification of the small jet transports. However, Air Force officials told AMERICAN AVIATION seven companies are still actively competing out of an original 14.

In addition to Lockheed, Fairchild and McDonnell have filed for certification for the multi-jet eight-to-ten-place utility transport, designated UC-X, and North American has filed for the twin-jet, six-place type, designated UT-X.

Fears that the competition might be dropped because of the tight money picture appear unjustified at this time. However, requirements have been both tightened up and broadened to justify a procurement program when the Air Force has selected the two winners.

The UC-X will have a navigational trainer capability, broadening its utilization of cargo and passenger airlift, as well as VIP transport. As a navigational trainer, it would eventually replace about 80 B-25s still used by the Air Training Command.

Although the original invitation to bid for the UT-X clearly specified a four-passenger, two-crew configuration, USAF had scanned proposals for a four-place model. But the latter is now completely ruled out.

Required as a combat readiness trainer, the UT-X will supplement the T-33 in the CRT inventory, indicating a smaller procurement rate than prob-

NORTH AMERICAN's entry in smaller, six-place combat readiness trainer competition was designed to incorporate the "Caravelle" engine mounting. New mockup is believed to be complete and plans are to produce a prototype, to fly sometime next year.

LOCKHEED rolled out its CL-329 last week, simultaneously revealed that a second prototype would come off the line early next spring. First prototype is powered by two Bristol Orpheus jet engines but second will have four engines, either J83 or J85. Scheduled for first flight next month, Jetstar is expected to cruise at 500 mph at 40,000 feet.

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Circle No. 6 on Reader Service Card.

ably originally anticipated.

Since announcing the competition, USAF decided to phase out T-33s with the Northrop supersonic T-38 trainer in late 1959. As the T-33 is phased out of Air Training Command, more will be available for proficiency flying. Therefore, the UT-X will be procured to fill in the gaps.

Air Force has little hope of being able to procure the two planes at suggested prices in the AMC invitation, which were $400,000 for the multi-engine and $200,000 for the small twin. Lockheed officials believe they can bring their CL-329 Jetstar in for under $1 million but undoubtedly it will be more than double the USAF estimate.

**USAF, Navy may cooperate**

In order to get the best "buy" through quantity procurement, USAF is discussing possibilities of a joint evaluation and subsequent procurement program with the Navy. Plans for a similar competition were dropped by Navy because of the money shortage, but a partnership deal might change the picture.

Each company-financed prototype finally entered in the competition will be carefully evaluated before final selection is made, according to the Air Force. Lockheed's lead with the first prototype, therefore, gives it a head start on "debugging" but will not eliminate the Air Force's window shopping.

Evaluations will probably be completed in late calendar 1958. No procurement funds were asked in fiscal 1958 but some money may be requested in fiscal 1959 with bulk of procurements made the following year.

An atmosphere of caution and reserve prevails among both the military and the manufacturers. Lockheed will have invested $6.5 million in its project when its second prototype rolls out next spring. Fairchild has tied up $1 million in a mockup and is now building a new mockup incorporating wind-tunnel test design changes without yet committing itself to a prototype. North American, hard hit in recent cutbacks, still intends to fly a prototype sometime next year.

However, company spokesmen strongly indicate that no production is possible without the military orders. One told AMERICAN AVIATION that an intensive market survey showed the civil market to be a very distant second to the military. Business aircraft users are unwilling to pay low-quantity prices and cannot come near guaranteeing a broad enough producing base to justify civilian production alone.

As a consequence USAF, in about two years or less, must come through with a firm enough minimum procurement order to justify the manufacturers' making the next-step investment of getting a production line moving.

Air Force has a great deal at stake in this experiment. Seven companies apparently are still willing to take the gamble of investing all their own funds in development to get a plane production-ready. If the Air Force leaves them holding their prototypes, off-the-shelf procurement will be dead. If it works, new industry-military partnership will be guaranteed.

Air Force and the other services could then rely on similar partnerships for similar developments at great savings. New airlift transports, cargo carriers and other non-tactical projects with potential commercial applications would be possible without the huge Federal investment in development costs. Airlift potential would be strengthened, since low priorities assigned by the military make them currently vulnerable to the economy axe.

**Playing it close**

Actually, Lockheed and North American are the only two companies publicly committed to prototypes. The other five manufacturers are playing it more close. Some apparently are waiting to see which way the Air Force will probably move. If it looks as if a procurement is in the air for fiscal 1959, a last-minute rush to build and fly prototypes can well be expected next spring and summer.

USAF officials declined to name the three unidentified companies. But speculation indicates Cessna and Northrop may be in the UT-X race, with Republic joining Fairchild, Lockheed and McDonnell in the UC-X. Design and engineering specification presentations by at least five of the seven entries have been made to the joint ARDC-AMC evaluation group monitoring the competition.

Still a big question mark is choice of an engine. All designs are based on use of either the General Electric J85 or the Fairchild J83. AMC currently is working out the engine delivery problem with Air Research and Development Command, AMERICAN AVIATION was told, but no specific dates are yet available.

Lockheed, flying its first prototype with two Bristol Orpheus engines, has announced it will roll out the second prototype early next spring, equipped with four J85s or J83s. Whether the Air Force is that close to production or Lockheed is just hopeful could not be clarified at press time.

**Choice may be difficult**

Lack of engines has been blamed for delay in some of the prototype programs originally planned in the competition. However, if the Air Force must make a decision between the two engines, the jet utility designs will not have to be changed. Reportedly, the engines are very close in dimension to each other. But a choice would be hard to make: Lockheed—although its brochures have advertised use of the GE engine—now is more inclined toward Fairchild's J83, which it feels is simpler and more conventional. North American, on the other hand, favors the J85 but would not be in a bind if the J83 were selected.

Observers feel that the competition will really shake down in about six months. Within that time, it is expected that the final contenders will probably sift down to about two companies in the small race and three for the utility transport.

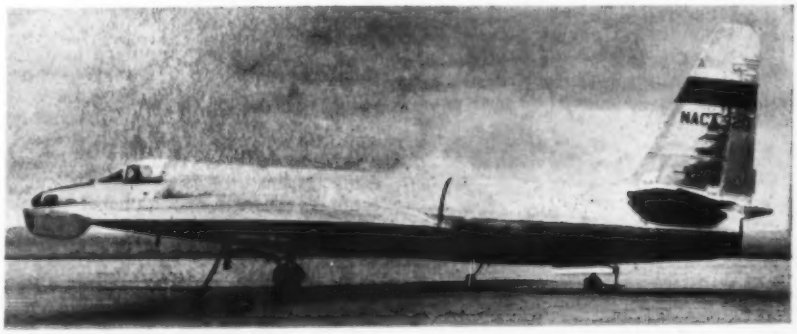
One thing seems certain at this time: Without a military order, the small jets won't roll off the production line.

## *Aircraft missiles spending tops fiscal '57 estimate*

**Spending for military aircraft and missiles as of May 31 had topped the fiscal 1957 estimate and the usual heavy spending month of June is yet to be counted. The services spent a total of $9,038,088,000 in the two procurement accounts, exceeding by $746,088,000 the original $6,292,000,000 estimate.**

**The jump over the January estimates was about equally divided between the two accounts. The services spent $7,169,093,000 for aircraft, $383,093,000 over; and $1,868,995,000 for missiles, $362,995,000 over.**

## *AF unit receives Lockheed U-2s*



FIRST ASSIGNMENT of Lockheed U-2 to a regular Air Force unit has been made to 4028th Strategic Reconnaissance Squadron (weather) at Laughlin AFB, Tex. Aircraft will be used to obtain weather data at altitudes up to 55,000 ft.

# AIL study reshapes U.S. air traffic picture

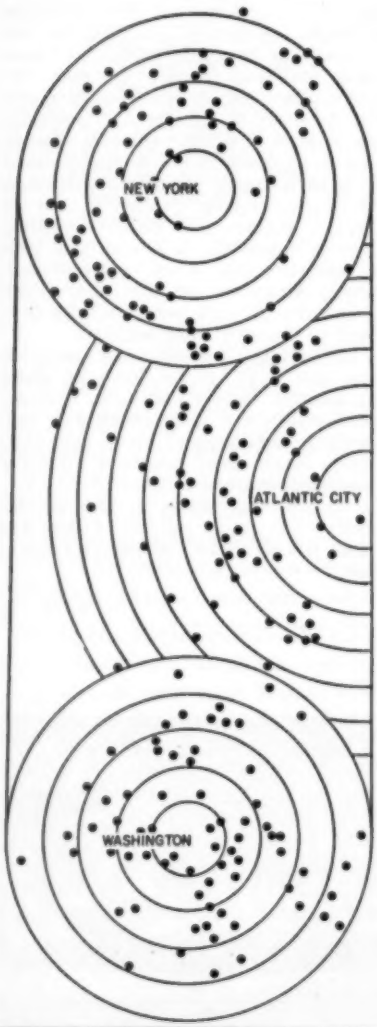
*Los Angeles, San Francisco are top traffic areas, according to report by Airborne Instruments Laboratory for Curtis' staff*

by Donald Frederick

THE SO-CALLED New York-Chicago-Washington "golden triangle" may mark the boundaries of the nation's most heavily traveled airline traffic area, but when it comes to *total* air traffic it's a different story.

Los Angeles and San Francisco, which rank third and fifth in the U.S. in airline traffic, move into the No. 1 and 2 spots primarily on the strength of their military and general aviation activity.

This is the surprising conclusion of the most comprehensive study ever made of U.S. air traffic, conducted by Airborne Instruments Laboratory of Mineola, N. Y. for the President's aviation facilities planning staff.




PLOT of three radar scopes in New York-Washington en route area photographed simultaneously by Airborne Instruments Laboratory at 11 a. m. January 26.

Results showed that Los Angeles, ranked No. 4 in population in the 1950 census, is the busiest hub of general aviation operations and the No. 2 spot for military flying. San Francisco, although it ranks sixth in private flying, is the No. 1 center of military operations. While focusing its survey at eight key cities in the country, AIL arrived at traffic ratings for 48 terminal areas in the U.S. for each specific type of operation (see table).

The AIL report, submitted to Presidential aide Edward P. Curtis prior to his formal recommendations for establishment of a Federal Aviation Agency and Airways Modernization Board, pinpointed these traffic statistics:

*Greatest number* of "instantaneous airborne aircraft . . ." in 1975 will be operating in a 50-mile radius of Los Angeles and will approximate 707. At this time the Los Angeles area will have to cope with 1,679 hourly aircraft movements—almost 28 a minute over a 100-mile diameter area.

Highest number of persons airborne last year at a moment of peak activity was placed at 1,400 for the New York area. Chicago placed second with 980, Washington third at 615 and Los Angeles next at 520. In computing these statistics AIL researchers assumed all airline transports operating with 62% load factor, military aircraft with normal crew and private planes at 50% of seating capacity.

In laying the groundwork for Curtis' recommendations on future ATC facilities, AIL produced a special group of traffic figures on New York-Washington operations, today's most heavily traveled airway.

Utilizing a new approach to traffic research, involving simultaneous filming of radar scopes in the area over a two-day period, the researchers came up with a closely defined breakdown of airline, military and civil traffic in this area and the first tangible estimate of total operations at present and for 1975.

Results showed that under VFR conditions New York-Washington traffic is only 17% airline, 44% military and 39% civil—a marked departure from figures used in the past in various proposals for allocating airway user charges. Total "peak instantaneous airborne planes" over the area numbered 91 of which 49 were classed as transient aircraft and 42 local.

A switch to instrument flight conditions showed a marked change in the traffic make-up. Under IFR, 55% of flights were air carrier, 37% military and only 8% private. Bad weather also cut the number of peak instantaneous aircraft to 38, about 40% of those flying under visual rules.

As to traffic estimates, AIL figures total New York-Washington en route operations now number 219,000 for airlines annually, 253,000 for civil itinerants, 177,000 for civil local flying and 405,000 military.

By 1975, airline operations will number 430,000 a year, civil itinerants 960,000, civil local 280,000 and military 360,000, for a grand total of 2,030,000 operations.

In its study of New York traffic conditions, the research group concludes that training for CAA ATC personnel falls far short of authorized levels. Personnel number only 594 in operational acitivities against an authorized level of 624. This staff handled about 6,350 takeoffs and landings at New York on peak days last year, with the heaviest volume reaching 561 in the late morning.

As a result of their experience in this initial study, AIL officials were

## *Aviation industry reports available from GPO*

To satisfy numerous industry demands for copies of reports prepared for the President's aviation facilities planning group, various volumes are now available at the U.S. Government Printing Office, Washington 25, D. C.

*Aviation Facilities Planning*—Final Report of Edward P. Curtis, Special Assistant to the President. Price 25¢.

*Summary-Final Report on National Requirements for Aviation Facilities 1956-1975*—Airborne Instruments Laboratory, Cornell Aeronautical Laboratory, Aeronautical Research Foundation. Volume I, 20¢.

*Air Traffic Volume*—Airborne Instruments Laboratory. Volume II, $1.50.

*Aircraft Characteristics*—Cornell Aeronautical Laboratory. Volume III, 45¢.

*Forecast of Aviation Activity*—Aeronautical Research Foundation. Volume IV, $1.00.

*Modernizing the National System of Aviation Facilities*—Curtis Systems Engineering Team. 40¢.

For previous editorial coverage on reports to Curtis group by Cornell Aeronautical Research Foundation and Cornell Aeronautical Laboratory see AMERICAN AVIATION July 29, p. 29 and August 12, p. 77 respectively.

convinced that measurement of instantaneous airborne traffic provides the most valuable information for the ATC systems planner. They strongly urge that the same type survey be repeated every two years to keep this data current.

The investigation by the Mineola electronics firm also extended into another key area affecting the modernization of the nation's airways—the long lead-time in development of new navaid systems. In a study of 11 systems now in use or contemplated for the future, it found that only two were scheduled to be completed in eight years.

In a third major area of study, dealing with airports used wholly or in part by civil aviation, the research group estimated that Federal expenditures for construction between 1933 and 1956 have totaled $989,212,552. It placed the present-day value of publicly-owned airports used by civil aviation at about $3.85 billion, noting, however, that this is a conservative estimate and one that could only be made more accurate by an on-the-site appraisal of a large number of airports.

The study did arrive, however, at an interesting breakdown of factors comprising the $3.85-billion investment in U.S. airports.

Real estate valued at $640 million represents 17% of the total, runways at $1.7 billion account for 44% and taxiways at $700 million represent 18%.

Airport buildings valued at $400 million account for 10%; lighting at $45 million constitutes 1% and remaining unevaluated factors make up the remaining 10%.

## *Rankings of 48 U.S. air terminal areas*

**(Based on 1956 traffic figures and 1950 population)**

| | Rank by Total Air Traffic | Rank by Air Traffic Category: Air Carrier | Military | General Aviation | Population 1950 Census |
|---|---|---|---|---|---|
| *LOS ANGELES | 1 | 3 | 2 | 1 | 4 |
| San Francisco | 2 | 5 | 1 | 6 | 9 |
| *NEW YORK | 3 | 1 | 14 | 2 | 1 |
| *CHICAGO | 4 | 2 | 25 | 3 | 2 |
| *WASHINGTON | 5 | 4 | 4 | 12 | 8 |
| Philadelphia | 6 | 13 | 10 | 5 | 3 |
| Boston | 7 | 12 | 7 | 8 | 5 |
| Dallas-Ft. Worth | 8 | 6 | 11 | 7 | 17 |
| *NORFOLK | 9 | 33 | 3 | 40 | 40 |
| Detroit | 10 | 8 | 23 | 4 | 6 |
| San Diego | 11 | 41 | 5 | 19 | 34 |
| Phoenix | 12 | 40 | 6 | 21 | 43 |
| Kansas City | 13 | 15 | 13 | 15 | 19 |
| Cincinnati | 14 | 11 | 16 | 16 | 13 |
| Columbus, Ohio | 15 | 29 | 9 | 26 | 29 |
| Cleveland | 16 | 7 | 37 | 9 | 10 |
| Hartford | 17 | 47 | 24 | 10 | 11 |
| Jacksonville | 18 | 22 | 8 | 47 | 47 |
| *ST. LOUIS | 19 | 16 | 21 | 17 | 12 |
| Seattle-Tacoma | 20 | 17 | 20 | 18 | 20 |
| San Antonio | 21 | 43 | 12 | 28 | 35 |
| Miami | 22 | 9 | 15 | 29 | 36 |
| Minneapolis-St. Paul | 23 | 18 | 28 | 14 | 15 |
| Houston | 24 | 28 | 34 | 11 | 22 |
| Pittsburgh | 25 | 10 | 36 | 13 | 7 |
| Omaha | 26 | 44 | 18 | 27 | 38 |
| Denver | 27 | 21 | 27 | 25 | 33 |
| Milwaukee | 28 | 24 | 31 | 22 | 18 |
| Birmingham | 29 | 27 | 17 | 45 | 26 |
| Memphis | 30 | 30 | 19 | 36 | 39 |
| *OKLAHOMA CITY | 31 | 39 | 22 | 31 | 45 |
| Portland, Oregon | 32 | 25 | 39 | 20 | 23 |
| Indianapolis | 33 | 20 | 43 | 23 | 27 |
| Buffalo | 34 | 23 | 30 | 32 | 16 |
| Harrisburg | 35 | 48 | 35 | 24 | 21 |
| Atlanta | 36 | 14 | 32 | 33 | 25 |
| Nashville | 37 | 31 | 26 | 46 | 46 |
| *ALBUQUERQUE | 38 | 32 | 29 | 42 | 48 |
| Syracuse | 39 | 46 | 33 | 34 | 28 |
| Louisville | 40 | 19 | 42 | 37 | 31 |
| New Orleans | 41 | 26 | 40 | 41 | 24 |
| Tampa | 42 | 34 | 38 | 39 | 41 |
| Wilkes-Barre | 43 | 45 | 48 | 30 | 14 |
| Albany | 44 | 42 | 45 | 35 | 30 |
| Rochester | 45 | 38 | 47 | 38 | 37 |
| Charleston, W. Va. | 46 | 37 | 46 | 43 | 32 |
| Knoxville | 47 | 36 | 41 | 48 | 42 |
| Richmond | 48 | 35 | 44 | 44 | 44 |

*Areas surveyed by AIL.

## AMC reduces requirements for critical metals

Requirements for use of critical nickel and chromium in jet engines has been reduced as a result of a project sponsored by the Manufacturing Methods Branch of Air Materiel Command.

Specifically, the project reduced the amount of nickel and chromium used in a piece of ground support equipment—Palouste 140 turbine-driven air compressor. The program was carried out at Continental Aviation and Engineering Co.

Use of nicrobrazing and ceramic coating techniques enabled low-cost, non-critical material to be substituted for parts such as turbine bolts, pressure force balancing discs, turbine inlet nozzle shrouds, and inner and outer combustion chamber liners.

For the nickel-steels, such as Nimonic 75, a 310 grade stainless steel was substituted. Ceramic coating was applied to the 321 grade stainless steel. Uniloy 19-9DX was used instead of the nickel-steel 80A and 321 and 310 grade stainless steel sand and precision castings were substituted for a 321 grade stainless steel forging.

Critical materials eliminated amounted to 44.7 lbs. of nickel and 17 lbs. of chromium.

The same process and substitution methods, plus the ceramic coating process, are being used by Continental in making blades for J-69 jet engine for Air Force trainers.

## California firm announces 68-lb., one-man 'copter

E. Gluhareff Helicopter Corp., Manhattan Beach, Calif., has developed a 68-lb., one-man helicopter which it says is capable of military operations.

Testing of the machine has been limited to tether flights but the company plans to begin full-scale free-flight tests in a few weeks. The vehicle is powered by a burner-type jet engine located at the tip of its single asymmetrical rotor. Liquid propane is used as fuel.

McCulloch Motors of Los Angeles will produce the Gluhareff design.

## Correction

Name of Harvey Riggs, president of Grimley Engineering Corp. and International Electronic Research Corp., was incorrectly shown as O. Riggs (AMERICAN AVIATION, July 15, p. 23).

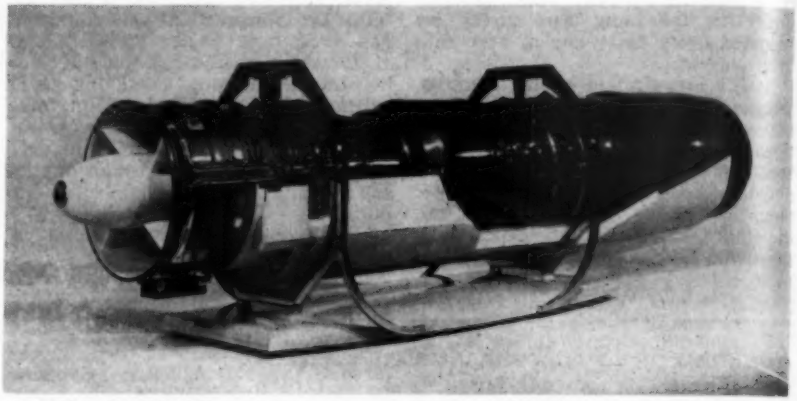
# Orenda reveals first details of big Iroquois turbojet

Orenda Engines Ltd. has taken the wraps off its Iroquois turbojet engine. The Canadian company's president and general manager W. R. McLachlan has revealed that the new engine is rated at at least 22,500 lbs. of thrust.

A display model of the Iroquois revealed little other than its size—about 20 ft. long and four ft. in diameter—since no working parts were shown. Sections of the intake and exhaust were blanked out.

Thrust-to-weight ratio of the Iroquois is better than 5-1, according to McLachlan, due largely to the extensive use of titanium. Weight of the engine is reported to be under 5,000 lbs.

The engine will power the 34-ton Avro CF-105 Arrow to altitudes of eight or nine miles in seven or eight minutes. The Orenda engine has passed exhaustive ground-running tests and will soon be flying at altitude in a specially-modified B-47 Stratojet on loan from the USAF. The Iroquois is mounted on the right side of the bomber just below the horizontal stabilizer.



ORENDA IROQUOIS engine develops more than 22,500-lbs. thrust without afterburner and reportedly about 30,000 lbs. with afterburner. Future development of engine, one of most powerful in existence, is expected to increase its power considerably.

Orenda officials say that the new engine, despite its size, contains fewer parts, including afterburner, than the predecessor Orenda 14 series without afterburners.

The Iroquois is expected to be manufactured in the United States (reportedly by Curtiss-Wright) following completion of a licensing agreement being negotiated.

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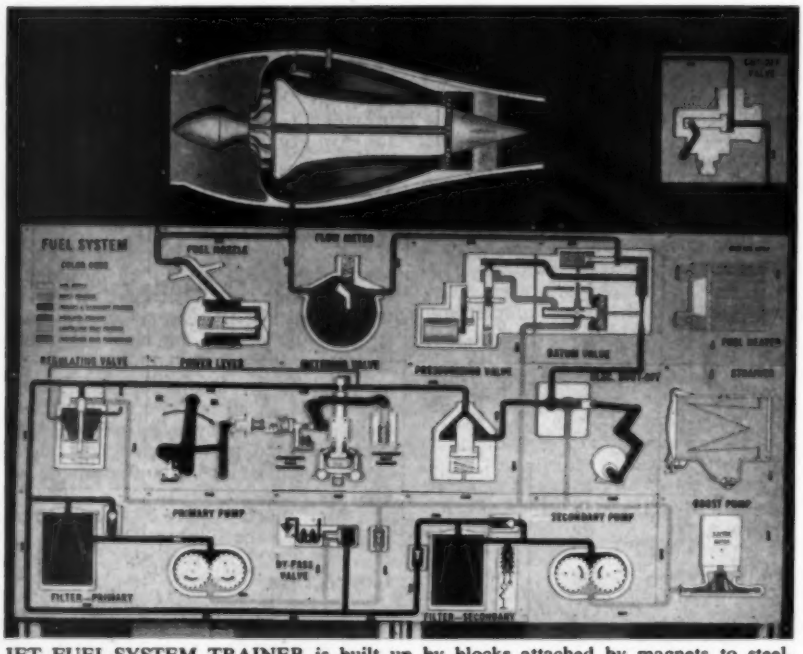
# Navy adopts magnetized visual training aid

Navy has adopted a new training aid that permits instruction in basic principles of complex aircraft systems by a "step-at-a-time" inductive method.

The device consists of a foldable steel-faced panel upon which are attached 1-ft. square plywood blocks with permanent magnets. The instructor places various "parts" on the panel, beginning with a simple system and "building" it into a complex system.

According to Project Engineer Ed Baklini of the Naval Training Device Center, Port Washington, N.Y., the inductive approach trains a student in the basic essentials. He is never exposed to the complete, highly complex system until he is ready for it.




JET FUEL-SYSTEM TRAINER is built up by blocks attached by magnets to steel-faced panel. Individual components are cut away and critical movements animated. To assist instructor, each section is numbered in sequence and keyed to guide manual.

Baklini developed the training aid after working with various animated training devices. By combining other ideas, he visualized the "build-up" device as a means of easy transition of students into the more difficult trainers.

Manufacturer of the new aid is Burton Rodgers Technical Training Aids, Inc., Cincinnati. To date, 32 have been placed in Navy's pre-flight and technical schools or used in Naval Air Reserve Training activities.

Current models cover powerplant, oil, engine and airplane fuel, hydraulic and electrical systems. The hydraulic trainer begins with the simple hydraulic jack and finishes with close center, open center and combination modern aircraft hydraulic systems.

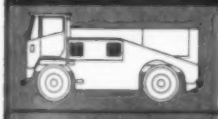
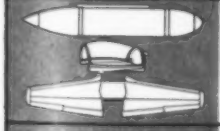
According to Capt. C. H. S. Murphy, commanding officer of the training device center, a complete, new set of basic jet systems has been developed and will be added to the present set. Included in the new systems are jet-engine fuel systems, all types of turbine engines and jet-engine starting systems.

## Fairchild gets order for 18 more C-123s

Fairchild Engine & Airplane Corp. has received an Air Force order for 18 additional C-123 assault transports, bringing the total order to almost 300.

W. L. Landers, vice president and general manager of the Aircraft Division, said the new order will permit the company to continue production of C-123s through 1958.

# CAPABILITIES . . . Manpower, Tools and Experience

| BEECH BUILDS | |
|---|---|
|  | MA-3 MULTI-PURPOSE VEHICLES |
| | C-26, MD-3 POWER UNITS |
|  | TANK-WING-MAJOR SUBASSEMBLY SUBCONTRACT PRODUCTION |
| | BEECHCRAFT T-34 TRAINERS |
| | BEECHCRAFT L-23 TRANSPORTS |
| | 4-PLACE BEECHCRAFT BONANZA |
| | 6-PLACE BEECHCRAFT TWIN-BONANZA |
| | 8-PLACE BEECHCRAFT SUPER 18 |

This is the Navy XKDB-1 target plane, parent to a whole family of rocket and turbo-jet powered drones being developed by Beechcraft engineers.

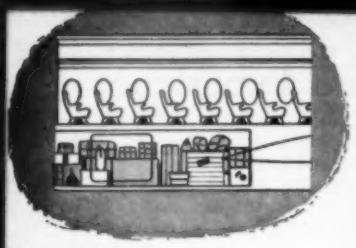
The newest member of this famous family is the Model 1013 designed for photo and television reconnaissance application. With multiple camera installation, the remote controlled Model 1013 can be used for both day and night observation.

Beechcraft is also engaged in research and development work on launching and recovery systems for missiles, drones and manned aircraft; engineering test programs on aircraft emergency escape systems; and classified projects in the advanced fields of aerodynamics, cryogenics, thermodynamics, and aircraft range extension.

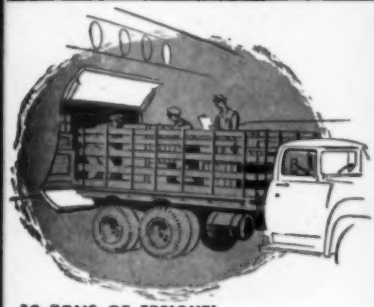
Beech Aircraft Corporation can put its capabilities to work to solve your research, development or production problems. Telephone or write Beechcraft's Contract Administration Division today.

Beechcraft

BEECH AIRCRAFT CORPORATION, WICHITA, KANSAS, U. S. A.

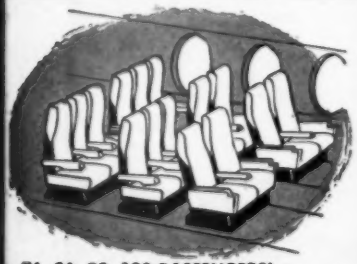


**2-IN-1 AIRCRAFT!**
**The Vanguard's double-deck fuselage makes it the most flexible airliner built. Though primarily a passenger plane, during low traffic periods it can continue to bring in revenue operating solely as a freighter!**



**10 TONS OF FREIGHT!**
**The Vanguard's two lower deck cargo holds have a capacity of nearly 1400 cu. ft. — enough to carry the plane's full payload in high density freight. With two 5' 6" wide doors, cargo can be simultaneously loaded and unloaded quickly, easily.**

**UTMOST PASSENGER COMFORT!**
**The new Vanguard has all the comfort features that have made the Viscount so popular with passengers: the quiet and smoothness of jet-prop flight . . . king-size panoramic windows . . . wide, fully-reclining seats.**

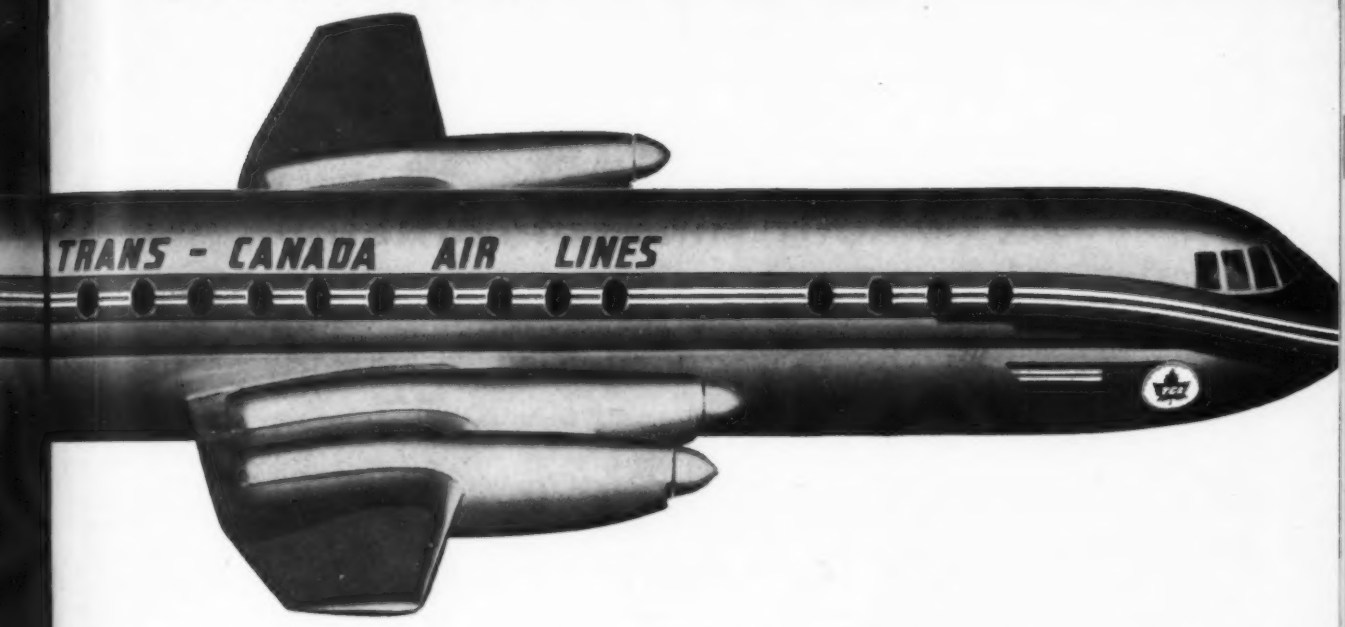


**76, 86, 93, 120 PASSENGERS!**
**The luxurious upper deck passenger cabin has unusual layout flexibility . . . can be adapted to all first-class, mixed-class or all tourist accommodations.**

# NIGHT AND DAY...

Night and day, *every* night and day, the new jet-prop Vickers Vanguard will be a money-maker. During peak passenger periods, it can serve as a de luxe, large capacity airliner. But here's where the Vanguard differs from all other airliners: during off-peak periods, it can serve profitably as an *all-cargo* plane — thanks to the Vanguard's unique double-deck fuselage. Its upper deck consists of an exceedingly comfortable passenger cabin with a capacity of up to 120 plus crew. And its lower deck consists of two cargo holds capable of carrying 10 tons of freight — without modifying the passenger cabin in any way!

*The new double-deck jet-prop VANGUARD*




# A FULL-TIME MONEY-MAKER

**EXCEPTIONALLY QUICK TURN-AROUND!**
The new Vanguard was designed with quicker turn-around in mind. Result: remarkably fast freight and passenger handling and outstanding ground maneuverability. Each of the Vanguard's two cargo holds has an extra-wide door at truck loading level. There is ample floor space and working height inside. To facilitate passenger flow, there are cabin doors fore and aft — each with built-in folding stairs.

Because of its minimal turning circle of 74′ and the clear view from the pilot's cabin of both outer engines and wing tips, the Vanguard can be safely and quickly maneuvered even on crowded ramps. With its low pressure tires, the Vanguard can use existing runways of most airports.

Powered by four Rolls-Royce Tyne jet-prop engines, the Vanguard will be capable of speeds up to 425 mph over a 2500-mile range with a full payload. The Vanguard will have a low noise level and will create no special airport noise problems. Into each Vanguard will be built over 2 million flying hours of Vickers jet-prop experience. And there's no substitute for experience!

## *jet-prop* VICKERS VANGUARD

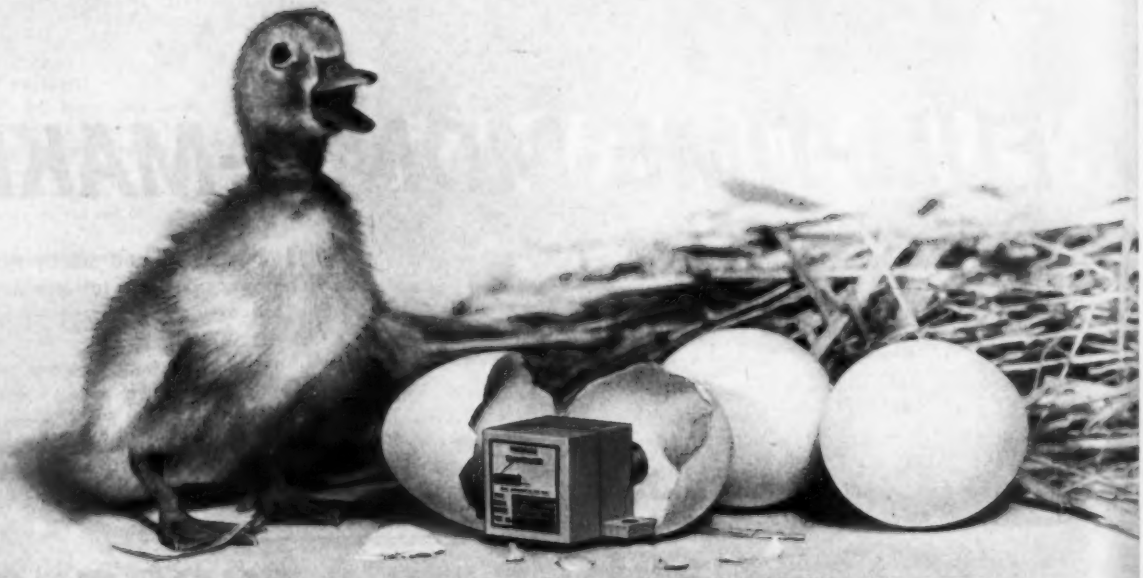
***POWERED BY FOUR ROLLS ROYCE-TYNE ENGINES***

*U.S. REPRESENTATIVE: CHRISTOPHER CLARKSON*
*10 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.*

*VICKERS-ARMSTRONGS (AIRCRAFT) LTD. • WEYBRIDGE, ENGLAND*
*MEMBER COMPANY OF THE VICKERS GROUP*

# TALK ABOUT MINIATURIZATION!

*...Giannini has really hatched one this time.*



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# NACA develops new tool for hi-temp research

*Arc-powered air jet simulates high-temperature phenomena up to 20,000°F; based on principle of plasma jet*

by William Beller

ANOTHER PATH will soon be beaten through the thermal thicket with a new testing device able to simulate high-temperature phenomena. Described by staff engineer Joseph N. Kotanchik, National Advisory Committee for Aeronautics, as a high-intensity arc-powered air jet, the device is now in the pilot-model stage.

Further developments are rapidly expected because the operating principle is based on the plasma jet, the theory of which has been known for more than three decades. However, applications of this theory to test-type instruments have only recently been made.

Temperatures in the 20,000°F range and heating rates up to 5,000 BTU per sq. ft. per second are typical of those conditions needed to make modern aerodynamic, structural and materials studies. These conditions are met in the high-temperature environments surrounding hypersonic vehicles and, to a lesser extent, in jet- and rocket-engine components, and airborne nuclear reactors.

In the past, NACA has operated a variety of facilities that sought to duplicate high-temperature effects. These include devices such as radiant heaters, furnaces, true-temperature windtunnels and ceramic heat-exchanger jets. Yet the maximum temperatures and heating rates attained were not even near the needed test regimes.

Industry stepped into the high-temperature testing picture early this year when Giannini Research Laboratories, Los Angeles, reported developing a jet able to reach 20,000°F temperatures. At the same time, the University of Chicago and General Electric jointly revealed that they had devised a jet able to reach 26,000°F. Heating rate for this last jet was given as 2,000 BTU per sq. ft. per second at 4 diameters from the nozzle.

These jets are known as plasma jets and in the past have been either water or noble-gas stabilized. A plasma is a state of matter consisting of a mixture of highly excited free electrons and positive ions.

To generate a plasma, an electrical potential is first set up across a gap bounded by an anode and a cathode. The cathode releases an electron stream which ionizes some of the atoms and molecules in the gap. In this way, additional electrons are freed, and collisions with atoms become more frequent.

Thus, the total kinetic energy of the particles in the gap continues to increase, with a corresponding increase in temperature. Finally, two sub-atomic streams are flowing—electrons to the anode, positive ions to the cathode. This is the plasma state. Light quanta are given off when electrons and ions recombine to form neutral atoms.

If the kinetic energy imparted to the electrons is sufficiently high, the particles will begin knocking positive ions off the anode, which ions proceed to the cathode. This stream of hot eroded ions is perceived as an arc.

Increasing the field potential will increase only the number of atoms ionized, and will have little effect on the upper temperature of the stream, about 7,500°F for a welding arc, unless it is suitably contained.

Such containment is used in water- and noble-gas stabilized arcs.

In NACA's DC water-stabilized arc, the agency uses an arc chamber of circular cross-section. The anode of the arc circuit, a movable carbon or metal rod, enters from the bottom of the arc chamber.

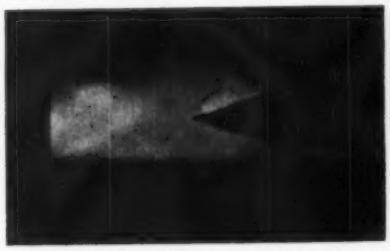
The cathode, which contains the nozzle, is at the other end of the chamber. Water is injected into the chamber through tangential openings in order to swirl the liquid to produce a void around the anode. In order to strike an arc, the anode is advanced until a current flow to the cathode is set up. Then the anode is quickly pulled back.

The high-intensity arc in the chamber ionizes the water vapor, which leaves the nozzle at high temperature and velocity. An anode automatic feed maintains the desired arc length. Excess water, which cools the chamber and the anode, is drained off.

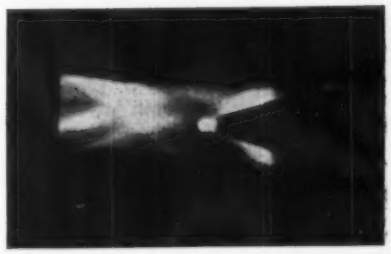
Water containment of the arc cools the outer layer of the plasma, thereby decreasing ionization in this region. As a result, conductivity of the plasma is lessened in the arc fringes, and current flux in the center of the arc is increased. This is the so-called thermal pinch, which squeezes the plasma's kinetic energy into a small tubular volume to effect large temperature increases.

A second effect experienced by the plasma, magnetic pinch, is particularly noticed at the higher tempera-

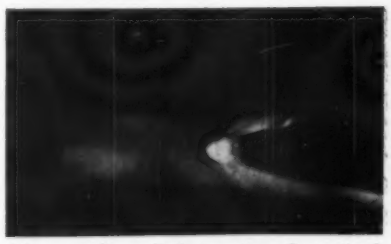
PHOTOGRAPHIC SEQUENCE shows four frames from motion picture of test of a 40-degree tungsten cone being melted by an air jet.



0.1 second; tip of cone is incandescent.

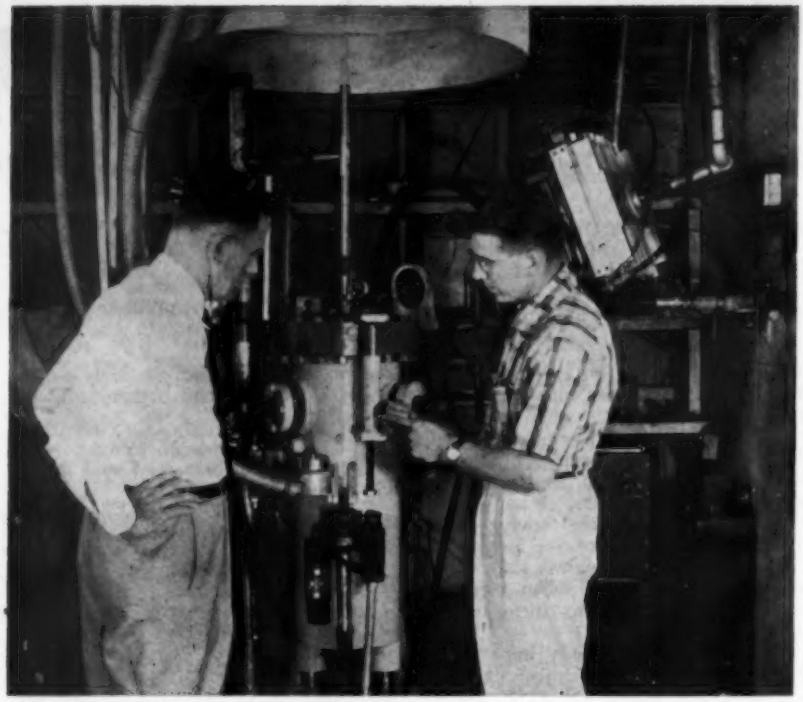


0.35 second; melting has blunted the tip of the cone.



0.7 second; melted tungsten flows back over cone; steel holder behind tungsten cone is melting at top.

0.9 second; specimen is hidden by luminous air behind nose shock.



ARC-POWERED air jet shown in hardware. Dark-colored cylinder capping white cylinder contains compressed air inlet and arc chamber.

tures. This effect tends to bring closer together two parallel-flowing electron streams because of their self-induced magnetic fields.

One major objection to water- or noble-gas stabilized plasma jets is that the efflux is not air—the gas needed for good aerodynamic heating simulation. Realizing this deficiency, NACA devised the air-stabilized plasma arc.

Kotanchik describes the air-arc equipment as containing three movable electrodes, feeding from three-phase ac power. The electrodes are in the lower part of a steel cylinder. The upper part of the cylinder embraces the arc chamber, into which pressurized air is passed.

The upper part of the cylinder also holds a graphite block in which the nozzle is formed. A ceramic plate separates the arc chamber from the lower part of the cylinder, which is filled with water intended for cooling. Electrical power is supplied through sliding contacts located in the water-filled space.

To operate this jet, the air flow is first started through the arc chamber and nozzle at the desired chamber pressure. Then the electrodes are advanced until a current flow is established between the three electrodes and the nozzle block.

Finally, the electrodes are withdrawn in order to stabilize the arc. With the onset of arcing, the pressure increases in the arc chamber. The air is consequently heated, ionized, and leaves the nozzle at high speed and temperature.

Some foreign material is contained in the arc, a result of the erosion of the electrodes. The eroded material is carried out by the air flow in gaseous form.

Although there is no water present in the air jet to cool its outer fringes for a thermal pinch, the high-pressure air is said to be adequate for the same purpose. In addition, because three electrodes instead of one are used, the magnetic pinch is many times multiplied over that accompanying a one-cathode chamber.

Electric arc-powered jets having a wide range of characteristics have been built at the NACA Langley Aeronautical Laboratory. Some of these characteristics are:

Power: 30 to 1,000 kilowatts, dc and ac.

Nozzle exit sizes: 1/4 in. to 1 in. diameter.

Jet medium: water, liquid nitrogen, liquid air, and gaseous air.

Temperatures: 7,000°F to 20,000°F.

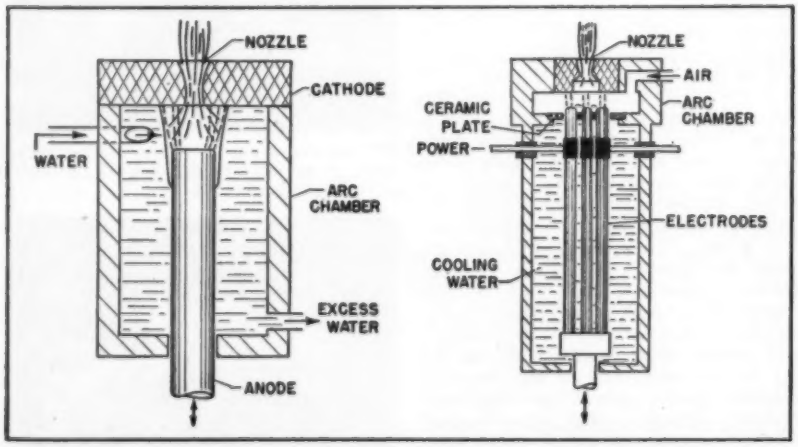
Heating rates: 600 to 2,200 BTU per sq. ft. per second.

Jet velocity: supersonic.

At present, NACA is operating two arc-jets: a 200-KW dc air jet and a 700-KW 3-phase ac air jet.

Completely satisfactory simulation of aerodynamic heating effects can be done only in high-temperature, high-speed air flow. Still, many high-temperature effects can be adequately duplicated in a static air field. High-intensity electric arcs are being used by NACA for both type studies.

A logical step forward for application of the air jet is the arc-jet windtunnel. Although such an enterprise is not yet on the drawing boards, its feasibility seems clear. The need for such a facility for aerodynamic, structural and materials research at very high temperatures is vital for development of hypersonic craft.




SKETCH at left shows principle of operation of a dc water-stabilized arc jet. Right, sketch of NACA's three-phase ac arc-powered air jet.

## Rocketdyne engineers study missile gases in tunnel

North American Aviation, Inc.'s Rocketdyne Div. engineers are probing rocket engine performance on the fringe of outer space by simulating the fiery gases of missile power with a windtunnel that pulls high-speed air through a vacuum. The tunnel is in operation at the Rocketdyne Division's Los Angeles, Plant.

In the tunnel tests, compressed air is released in a supersonic rush through scale models of rocket engine thrust chambers. The two-foot wide testing chamber of the tunnel is maintained under a partial vacuum adjusted to varying altitudes.

The tunnel was jointly financed by NAA's Rocketdyne Division and Air Force at a cost of more than $650,000.

# Human factors: key to equipment reliability

*ARINC report emphasizes the "stresses" put on electronic gear by personnel; says radical design changes are needed*

by Henry P. Steier

EMERGENCE of the "human environment" as a dominant cause of unreliability in military electronic equipment has been revealed in a new report summarizing reliability studies by Aeronautical Radio Inc.'s Reliability Research Department.

Emphasis on this and three other major factors in unreliability is given in the report which represents six years of field observation and laboratory studies by ARINC under contracts administered by Navy Bureau of Ships.

Although actual reliability studies by ARINC began in 1946 to meet critical airline needs for electronic device reliability, studies for the Department of Defense began in 1951 and were limited to electron tube studies.

As ARINC dug deeper into reliability research and engineering the need for closer integration of component and equipment studies became apparent. Emphasis in the second three-year study was on equipment reliability.

One of the major conclusions of the report is that equipment must be designed that will better withstand the "stresses" humans impose on it.

Together with the "human environment" factor, these factors were also singled out for attention in ARINC's latest report:

*Insufficient consideration* in the original design of the variations of parts characteristics with time.

*Interaction of various conditions* of operation that were not visualized in the design.

*Lack of control* of the essential characteristics of the parts used.

The human factor was, however, blamed for causing the greatest "stresses" on electronic equipment. These stem from the complexities of trouble-shooting techniques and from operating and maintenance procedures.

For its purposes ARINC defined reliability as "the probability of satisfactory equipment performance." When looked at from this point of view operator satisfaction becomes a top factor in any measurement of reliability.

Satisfactory performance as seen by the operator can be entirely different than conformity of equipment with specifications set by the buyer on the manufacturer.

ARINC believes reliability evaluations on military equipment should be based on user satisfaction rather than conformity to specifications. Proof of this necessity has been demonstrated in cases under study.

One example would be the buyer of a transmitter-receiver for use in military aircraft where the specification called for 10 watts output at the transmitter and 5 micro-volt sensitivity at the receiver.

Even though the equipment met these specifications the operator would not automatically be satisfied. In using the equipment he would not know if those performance factors were met. His satisfaction would depend on whether the values of input-output were properly chosen for the use he wants to make of the equipment.

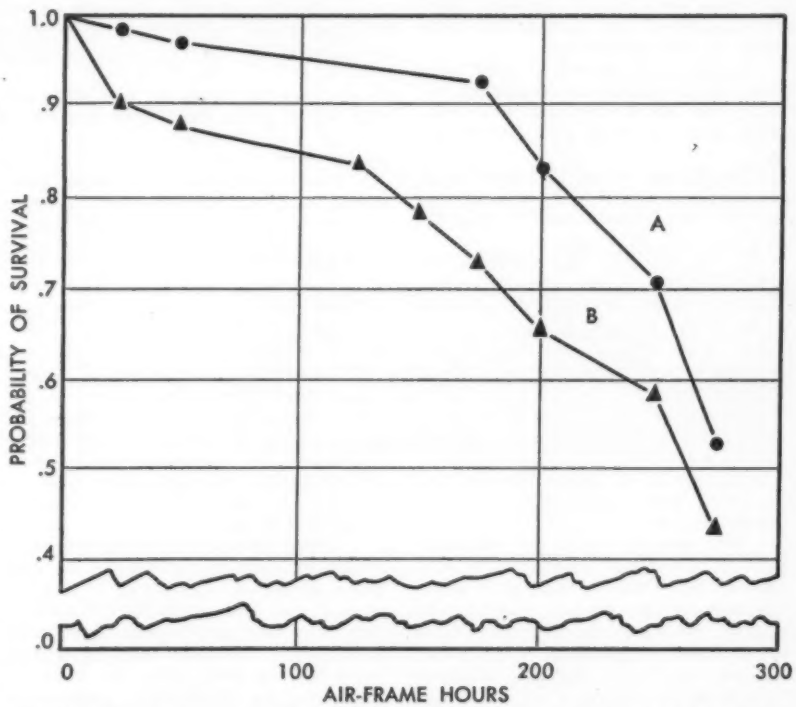
In another case ARINC investigated a low-power complaint on transmitters of AN/PRC-6 equipment. Because of peculiar requirements in this case, military personnel were trying to use the equipment at a range much longer than it was designed for.

Even when performance is adequate for the task operator complaints occur. Relationships between the operator and modes of operation strongly influence reliability reports. There are often only specific and limited periods of time when an operator forms judgment on equipment.

This might be during take-off, a few times during flight, or at the be-

## *How to obtain text of ARINC report*

Full text of the "General Report No. 2—Electronic Reliability in Military Applications" by Aeronautical Radio Inc.'s Reliability Research Department will be available free of charge to all military electronics contractors through usual military sources. Others may obtain the report for $3 per copy after Sept. 15 by writing ARINC at 1700 K St., N.W., Washington, D.C.




EFFECT of tube-removal practices at a military base on reliability statistics of fire-control equipment magnetrons. Curve A represents reliability when removal definitely verified to be attributable to magnetron defects is considered. Curve B represents reliability based on removals by military personnel who judged tubes to be defective.

ginning of a bombing run. The decision on performance under such conditions becomes more "mission dependent" than "time dependent."

ARINC has found that military equipments accumulate operating hours so slowly there is little deterioration during actual usage. Operator complaints seldom represent a clear-cut deterioration evaluation.

From these studies ARINC concludes inadequate attention is given to human-engineering aspects of military equipment design.

This concerns such matters as number of positioning of adjustments, switches and controls. ARINC believes there is reason to emphasize human-engineering even more than actual performance capabilities of equipment.

Weight is given to this argument by such surveillance tests as those on AN/ARN-21 equipments. Channel switching on this equipment in jet aircraft was so located that the pilot could not switch the channel and see the channel number at the same time. Complaints of inoperative equipment were proved to be operator errors in switch positioning.

In another case controls on an RT-66 transmitter invited operator errors in adjusting antenna coupling for maximum output. Only indicator of output is a meter, but the operator can adjust the antenna in such a way that the output tube is overloaded. This produces a large amount of gas in the tube and causes early failure.

Wide variations in trouble-shooting techniques between different services using the same equipment have been discovered and indicate the complexity of this problem.

In one case controlled tests were run on AN/ARC-27 equipment at Air Force and Naval Air Stations. Complaints were far more prevalent at AF bases.

At the AF bases 100 percent of the complaints were followed by repairs. At the Naval bases 71 percent were followed by repairs.

In the AF case the results meant something was replaced or adjusted in every equipment on which a complaint was received. General practice in such cases is tube replacement since this is the easiest and commonest method of trouble-shooting.

This elementary attack on complaints means little insofar as actually pinpointing troubles is concerned, since even equipment in good operating condition has out-of-spec tubes in many cases.

The only result is vast wastefulness of tubes and inefficient repairs. ARINC has observed that incomplete diagnosis often creates maintenance-induced malfunctions and, in cases where tube replacement is a major method of repair, partially repaired equipment is released for operation since tube failure was only symptomatic of the real trouble.

Finding a better way to pinpoint malfunctions is not going to be easy.

## *Complaints and repairs on AN/ARC-27 equipment*

| | Air Force Bases | Naval Air Stations |
|---|---|---|
| Number of pilot complaints | 27 | 115 |
| Number of maintenance complaints | 17 | 5 |
| Total number of complaints | 44 | 120 |
| Total number of repairs | 44 | 85 |
| Percentage of complaints followed by repairs | 100 | 71 |

TYPICAL RESULTS of controlled tests on maintenance repairs which show operator complaints are not always caused by actual technical defects.

In one test at Norfolk Naval Air Station a controlled test was run where half of the equipment was maintained by engineers and the other half by military maintenance personnel.

The engineers were asked that tubes be replaced only after it was proved that tubes caused the malfunction. Military personnel were left to use normal procedures.

Half-way through the test period the supervisor of the engineers complied with the required proviso to "find" the troubles. Then he switched to using a tube tester as a help for deciding tube rejection or acceptance. Tube testers currently used can be misleading indicators of tube suitability for a malfunctioning circuit.

ARINC maintains that the fact that a qualified technical representative felt compelled, despite elaborate test equipment available to him, to resort to the simplest type of troubleshooting, indicates the equipment presented no easy way of obtaining a good picture of proper functioning of sub-units.

From these and many other controlled tests, ARINC has concluded that equipments can be repaired or maintained in many ways without affecting reliability.

The failures have been shown to be complex and to involve combinations of variations in different parts of equipment that failed.

From this conclusion the observation was drawn that "there is no simple and adequate way of determining the cause of failure in present-day equipments, or of deciding when a part has exceeded the limits that can be tolerated in the particular equipment in which it is used."

The dominant phenomenon in variations of part characteristics is tube deterioration. It was found 80-to-90% of defective tubes collected by ARINC had time-dependent flaws. Conclusion is that there is greater need for finding ways of increasing tube life than for improving the mechanical structure of tubes.

Great majority of military tube failures of a mechanical nature were produced by the human environment of military equipment caused by handling. Only 10% failed because of tube weakness or manufacturing faults.

ARINC's researchers conclude that the interaction-of-various-conditions-of-operation factor is not amenable to control at the design stage alone. This is because the possible combinations of events that could effect reliability of complex equipment are almost unlimited.

Only possible solution to this lies in exhaustive laboratory and field tests which would be combined with knowledge derived from previous experience and sound engineering principles, ARINC says.

On control of parts characteristics, ARINC believes quality control in parts production is not enough. The designer should investigate the characteristic of interest, determine the maximum variations to be expected and use the parts in a circuit that will tolerate his findings.

The report suggests that solution to the outstanding problem of human environment lies in a radical change in the design of military equipment to adapt it to the realities of military operating and maintenance conditions.

Prime consideration should be given to ease of operation and simplicity of maintenance. Dr. Ernest R. Jervis, consultant to ARINC's Reliability Research Department, pointed out that TV sets have been designed for such simple operation that a child of four years can "fiddle with the controls" and get satisfactory performance.

If adequate field tests on pilot-production or initial-production models of military equipment are performed in military environments and the results promptly fed back to designers, ARINC believes the attainment of operator satisfaction will be greatly accelerated.

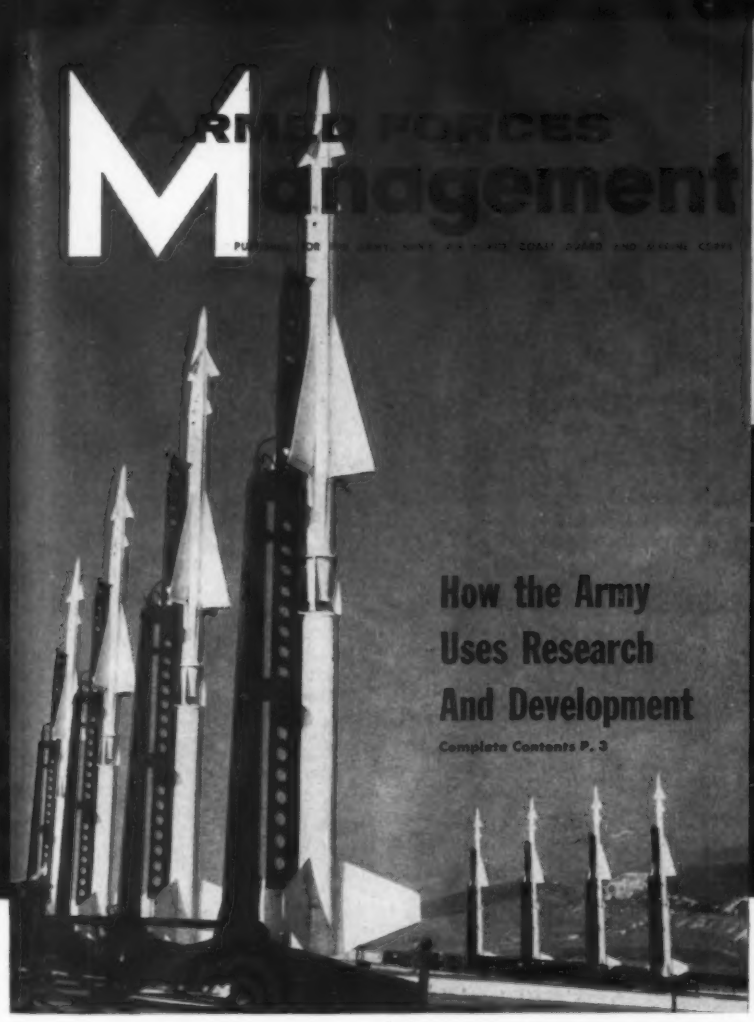
And, if consideration is given to full possibilities inherent in pluggable sub-units of circuits, greater simplicity may be achieved in maintenance.

## Tiny magnetron to combat radar countermeasures

New capability of combating enemy radar countermeasures may result from a tiny voltage-tunable magnetron developed by the General Electric Co.'s Power Tube department. It measures less than 5/8" high and ¾" in diameter. The tuning principle permits linear change of oscillation frequency with changes in anode voltage over the range of 2,000-4,000 megacycles.

First displayed at the Western Electronic Show and Convention in San Francisco, the new GL-6917 magnetron has an average continuous wave power output of about 0.5 watts over the 2,000-4,000 band width with a variation in power of 0.5 watts.

The tube features a metal-ceramic envelope designed to permit unpressurized operation up to 60,000 feet altitude.



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# Area rule may boost jet transports' speed; NACA

*New research by Richard Whitcomb indicates 50 mph gain is possible by reshaping portions of wing, fuselage*

by Joseph S. Murphy

NATIONAL Advisory Committee for Aeronautics has disclosed first details of "area rule" research in lower subsonic speed regimes that may permit increases in the cruising speed of future jet transports by as much as 50 mph.

Experimental results of work at NACA's Langley Aeronautical Laboratory under Richard T. Whitcomb, area rule discoverer, has indicated that a reshaping of certain portions of the wings and fuselage of future jets may delay compressibility drag rise by about 0.07 Mach number, the equivalent of 50 mph at cruise altitude.

NACA says fuselage reshaping would include the addition of a bulge which might take the form of a "raised cockpit canopy" forward of the wing. Wing redesign would simply call for positioning of several small nacelle-shaped fairings on the rear portion of the upper wing surface.

The effect of these changes would be a redistribution of cross-sectional area of the fuselage wing combination along the lines of the original area rule concept. This provided that the fuselage of high-speed military aircraft be "pinched" in the wing area to maintain as nearly as possible a constant cross-sectional area from one end of the airplane to the other, thereby delaying the sharp drag rise at transonic speeds.

NACA's work on the slower jet transports has been in progress at Langley for some time and is aimed at the large and rapid drag rise experienced by these aircraft at about Mach 0.8 or 550 mph at an altitude of 30,000 ft.

The experimental results revealed by NACA, however, are based purely on aerodynamic work in its large transonic windtunnels. This has not taken into account such factors as weight, powerplants, flutter, takeoff and landing characteristics and wing-span loading. So far NACA has conducted tests with scale models having wing and fuselage characteristics similar to current jet designs.

Although Whitcomb's research is continuing, the question of whether the results can be profitably adapted to jets now in production is one NACA leaves to the manufacturers. From immediate industry reaction obtained by AMERICAN AVIATION, timing appears to be the critical factor.

Adolph Burstine, asst. chief engineer at Convair, says "We have not really had a chance to evaluate application of the area rule to a transport. We are familiar with Whitcomb's work and have had people at Langley Field.

"At this moment it is impossible to say to what extent area rule studies could apply to the 880. Right now this design is frozen. We are interested in these studies for the future. Whitcomb has been right before."

### "Pretty good shapes" now

At Lockheed, C. L. Johnson, vp-engineering and research told AMERICAN AVIATION he did not know of any transport design that might profit from application of the area rule design concept.

"They are all pretty good shapes to start with," said Johnson. The Lockheed official said he has made a report to Hugh Dryden, NACA director, that in tests similar to those by NACA, Lockheed has been unable to show similar gains either on straight or swept wings.

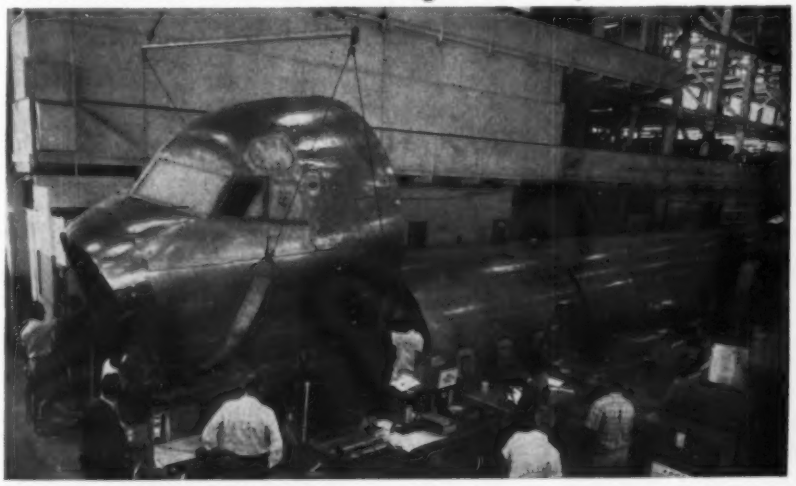
"The area rule will work transonically on a few restricted delta wing or swept-wing airplanes as it did on the F-102," said Johnson, "but it does not work on straight wings or on good swept-wing designs."

Johnson said he thought NACA might obtain different results when its transport tests are completely evaluated. Lockheed tried "bumps" on the wings of the F-94C in 1953, but obtained no reduction in drag and went through 70 such configurations with the F-104 with completely negative results, Johnson added.

Douglas engineers reported they have been studying NACA's transport findings to see if the area rule principle could be used on the DC-8, retrofitting if possible. But considering the other aerodynamic effects, such as weight, lift and control characteristics, a Douglas spokesman said it became a question whether any appreciable advantage would accrue.

Boeing officials, when contacted on the advanced work by NACA on the area rule for transports, declined to make an official comment at this early date. However, with the big stake held by the Seattle firm in the commercial jet business today, it becomes quite obvious that Boeing engineers will waste no time exploring all possibilities of its use on the 707 jet series.

*Lockheed Electra nose in mating dock*



FIRST LOCKHEED ELECTRA turboprop airliner takes shape at the Burbank factory. Wings and empennage sections will be added this month. First model is slated to fly in January. Electra is scheduled to begin airline service by end of 1958.

# New CAA report says jet age problems exaggerated

by William O'Donnell

A NEW LOOK at jet transport operational requirements has reduced many of the so-called jet problems to their proper perspective and has resulted in a more sensible approach to integration of the turbine transports in the civil aviation picture, according to the Civil Aeronautics Administration.

In "A Report of Progress and Developments as of July 1957," CAA said much of the public concern and hysteria over civil jet difficulties manifested during the past year has been dispelled by an intensive study of requirements.

Particular problems which have been chopped from mountain to molehill size include runway length and strength, foreign object damage to jet engines, fuel reserve, recovery of full thrust on approach, reverse thrust and noise.

CAA findings on these problems are summarized in the report:

"Runway problems with regard to length and strength appear to be of minimum concern in instances where the jets will fly the same route structures as the piston transports. Runway length increases will be required for jets used to fly ranges in excess of those presently accommodated.

"Improvements in compressor design and intake design of civil jet transports, plus potential developments such as the aerodynamic screen, and good housekeeping of ramps and taxiways is now considered to satisfactorily handle this problem.

"Civil jet manufacturers have used great care in designing the civil jets to have holding fuel reserves and general terminal performance comparable to present civil practice.

"The twin-spool and variable-stator jet engines have shown . . . they have recovery times essentially comparable to present large piston engines.

"Development of reverse-thrust devices now indicates that jet reverse thrust should be effective.

"Noise suppressors are predicted to reduce the noise of civil jet aircraft down to that of present, large piston-engine aircraft. . . . All airlines are willing to take an economic penalty to reduce the noise level of the civil jet transports so that their aircraft can live in reasonable harmony with the community."

By July 1961, the report says, U.S. manufacturers will have produced 466 jet transports and from one-half to two-thirds of these will appear in U.S. operation. In addition, foreign-built jets will be added to this figure. On May 15 this year there were 771 four-engine piston pressurized cabin transports in U.S. scheduled operation.

Other items to be considered in making adjustments for jet operations, according to CAA, include:

*Terminals and related facilities*—Substantial increases in the passenger capacity of transport aircraft must be taken into consideration in the development of airport terminals and related facilities. Passenger capacity of transports for which applications for CAA type certificates have been made range from 80 to 219, compared with the piston-engine transport's 50-100.

*Crosswind landing*—Jet transports with swept wings are more sensitive to crosswinds. Civil Air Regulation for transport airplanes require establishment of a crosswind component in which it is safe to take off and land and, further, that there be no uncontrollable ground-looping tendencies in winds up to 20% of the stalling speed. Maximum crosswind values of up to 35 knots are being proposed for coming jet transports.

*Fuel type*—U.S. airlines have generally expressed a preference for kerosene, primarily on a density and cost basis, as well as possible improved fire safety.

## *Cost of quieting jets*

One airline has reported that the cost of quieting the 30 large jets in its fleet will be about $50 million over the operational life of the jet fleet. The figure includes the cost of power lost, increased aircraft weight and fuel consumption necessary to fit the engines with noise suppressors.

## *Current CAA jet projects*

Ten U.S. manufacturers have applied for CAA type certificates for jet and turboprop aircraft. Arranged, according to category, the companies and their jet aircraft are:

**Large Jets**
Boeing 707, -100 and -200 series
Boeing 707, -300 and -400 series
Convair 880
Douglas DC-8

**Executive Jets**
Fairchild 185
Lockheed GL-135
McDonnell 119
North American 246

**Turboprops**
Beech 112
Grumman G-159
Lockheed model 188 (Electra)
Lockheed model GL-108 (commercial C-130)
On Mark model 450

Eight foreign manufacturers have applied for type certificates for turbine transports.

**Large Jets**
De Havilland Comet 4 and 4A
Sud-Aviation model 210 (Caravelle)

**Executive Jets**
Morane-Saulnier MS 760

**Turboprops**
Armstrong-Whitworth model 650
Aviation Traders model 90 (Accountant)
Bristol model 250 LR (Britannia)
Bristol model 300 LR (Britannia)
Fokker model F27 (Friendship)
Vickers model 810 (Viscount)
Vickers model 840 (Viscount)
Vickers model 950 (Vanguard)

## TWA, Delta officials inspect Convair 880 mockup

TWA and Delta Air Lines officials got their first look at the interior of the Convair 880 in the newly-completed full-scale mockup of the jet transport.

Varied cabin arrangements possible in the aircraft were shown in the mockup, including the "luxury" 88-passenger four-abreast configuration, and the five-abreast 109-passenger coach setup. Variations in mixed seating can be provided by the use of movable divider-coat racks which can be installed in a few minutes at any of five positions in the cabin.

In a report on the airliner, Convair revealed progress in other areas:

Windtunnel tests on the 880's empennage to evaluate control system design have been completed and tests to determine the structural integrity of the 880's wing fuel tank have begun.

The company reports that all phases of the tooling program are continuing satisfactorily. The 880 wing anti-icing system will feature a chemically-milled aluminum skin in the leading edge.

## TWA replaces hollow props with solid dural blades

Trans World Airlines is replacing propellers on its Lockheed L-1649 Jetstreams as a result of problems experienced in early operations of the new Hamilton-Standard hollow-aluminum prop blades.

Following a suspected loss of a piece of blade after takeoff at Paris recently, an investigation showed that a special nylon foam filler material had become loose within the blade and forced its way through the blade tip at a weld. New props use solid dural blades.

# Why SAS bought the Caravelle

*Operating features, early delivery gave French jet edge over nine other transports studied by Scandinavian carrier*

**by Anthony Vandyk**

SIMPLICITY, SPEED, quietness and availability—these were the reasons behind one of the most unexpected aircraft orders ever placed, Scandinavian Airlines System's purchase of six Caravelles.

The order represented the first foreign purchase of the French jet transport. Coming from a top-ranking carrier which previously had operated and ordered exclusively U.S. equipment, was of particular significance to Sud-Aviation. Besides its order for six of the Rolls-Royce-powered Caravelles for delivery starting early in 1959, SAS has taken an option on 19 more of the twin-engine French jets.

The Caravelle was one of 10 models that had been under study by SAS for use on medium-range routes. The others were the Bristol Britannia, Vickers Viscount, Vickers Vanguard, Lockheed Electra, Comet 3, Comet 4, Convair 880, Boeing 727 and Douglas DC-9.

K. Hagerup-Svendsen, vice president (engineering and research) of SAS, points out in connection with the study that it is virtually impossible to compare one aircraft type with another and state positively that it is better or worse. Various airlines must charge differently for performance and operating costs because there is no basic standard formula adopted or agreed upon that all can use.

Hagerup-Svendsen, incidentally, is critical of the ATA formula. He says it is used in as many different ways as there are airlines. All agree, he asserts, that in its present form the ATA yardstick does not give a fair answer. SAS has found various deficiencies in the ATA formula:

(1) It tends to burden heavy aircraft with disproportionately high overhaul and maintenance costs. (2) It does not provide for somewhat faster rate of depreciation for new piston engine and turboprop aircraft than for turbojet aircraft, since jets retain their passenger appeal for a longer time, primarily because of their greater speed. (3) There is no allowance to reflect the fact that fuel reserves for navigation error and holding vary with each type of aircraft.

Until about six months ago the requirements established by SAS for its new medium-range aircraft were predicated on this aircraft's ability to operate short- and medium-range routes within Europe and certain long-range routes (such as those to South America, Africa and the Far East). This required a range of some 1,800 nautical miles, an 80-seat passenger capacity and a gross weight of about 145,000 pounds. Delivery of such an aircraft was required for the period 1961-1962.

SAS's planning changed at the beginning of this year when the airline foresaw stiff competition on medium-haul routes from other European airlines with new aircraft types from 1958-1962. Accordingly, it was decided to try to find a new transport that would be available for delivery in 1959. The aircraft would operate only the routes in Europe plus a few to the Mediterranean area.

Requirements for range and seating capacity were then changed to about 1,000 nautical miles and 70 to 80 passengers. Simultaneously, it was decided to shoot for a gross weight of less than 145,000 pounds so that the aircraft would be able to operate out of more airports.

Meanwhile, the evaluation of the various aircraft types mentioned above had resulted in a decision within the SAS management strongly favoring a turbojet aircraft over a piston-engine or turboprop type. It was recommended that SAS should skip the turboprop era if possible. The reason was primarily to get away from the many complications (and the higher noise level) of the propeller and its gear which were thought likely to increase with more power and higher speed.

One of the main SAS requirements was for delivery in 1959 since the SAS shops would be busy with the introduction of the Douglas DC-8 fleet of seven aircraft in 1960 and 1961. SAS also wanted a very fast transport for use to make connections for onward-bound passengers coming in at Copenhagen on polar flights from Tokyo or Los Angeles and on transatlantic flights from New York.

The Caravelle seemed the logical aircraft to meet these requirements. A technical team sent to Sud-Aviation plant in Toulouse reported after 14 days that the French jet had, in the words of Hagerup-Svendsen, "an extremely solid and intelligent airframe construction." The delegation also noted that the various systems and components used in the aircraft were picked from the very best manufactured in Europe and the U.S.

Performance and flying capabilities of the aircraft won the team's approval. The Sud-Aviation plant, tooling and manufacturing system were found to be fully acquainted with all the latest developments in Europe and the U.S. on matters affecting transport aircraft construction and fatigue problems. Technically the Caravelle looked good.

TODAY AND TOMORROW—Caravelle will replace DC-6 on SAS' major European routes starting in 1959. One of the two French jet prototypes is seen at Copenhagen airport with an SAS DC-6 in background.

Meanwhile, SAS economists had been taking a look at the French jet from their standpoint. A cost study showed that the Caravelle had a lower cost per seat-mile on routes between 200 and 900 nautical miles than that of other aircraft evaluated by SAS. Hagerup-Svendsen points out that perhaps this might not be true for another airline since cost studies depend on the route network used, connection times with other aircraft types, etc. The average SAS route distance in Europe is less than 400 nautical miles.

Management of SAS was satisfied with the Caravelle since it was a jet rather than a turboprop and it was available for early delivery. Its speed was considered satisfactory although it is not in the same bracket as that of the big jets. However, the Caravalle's cruising speed of nearly 500 mph was considered a good introductory speed for jet operations.

SAS was particularly well pleased with the low noise level of the Caravelle. It seems likely that the French jet will be quieter than the U.S. models

due in part to the higher speed of the large American jets which will result in more cabin noise because of the increase of the turbulent air around the fuselage. But the main reason for the extreme quietness of the Caravelle is the engine location.

SAS engineers consider the position of the two Avons in the rear of the fuselage to have been a very wise design decision and one that will probably be copied in many future aircraft types.

Not only does it give no noise problem in the cabin, but it also entails less fire risk on a crash landing.

Another advantage of the Caravelle is that its external noise level on takeoff is no more than that of present day piston-engine aircraft. Runway requirements of the French jet are equal to or less than those of the other aircraft types studied by SAS.

Two engines are considered adequate and safe by SAS. Experience shows that turbine engines are more reliable on takeoff than piston types. The Caravelle will conform to all U.S., French and Scandinavian governmental requirements for single-engine takeoff and cruise performance.

It is difficult to assess to what extent the SAS order was clinched by the 100% on-time performance of the Caravelle during its South and North American tour which ended in June. It was felt during the U.S. phase of the program that the tour looked as though it would put the French transport firmly on the way to a successful sales program (AMERICAN AVIATION, May 20).

There is no doubt that the excellent reception which the Caravelle received in the U.S. reaffirmed SAS's confidence in the aircraft. The Caravelle offers an attractive way for an operator to get into the jet field quickly with a proven aircraft.

## Pan American cuts winter schedules to Alaska

Pan American's winter schedules for Alaska—to become effective Septemper 29—will reflect a reduction compared to last year. PAA has been experiencing losses in Alaska since these routes began operation free of subsidy. Last winter, PAA offered seven round-trips a week with Boeing 377s from Seattle to Ketchikan, Juneau and Fairbanks and two to Whitehorse. One DC-4 trip was operated between Fairbanks and Nome.

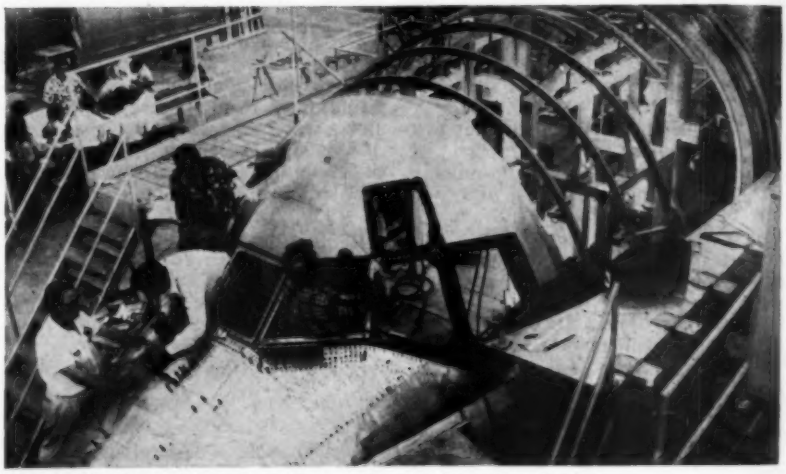
This winter's B-377 flights will comprise: Seattle-Ketchikan-Juneau, 2; Seattle-Fairbanks, 3; Seattle-Ketchikan-Juneau-Whitehorse, 2. In addition two weekly cargo DC-4 schedules will be flown between Seattle and Fairbanks and one DC-4 will operate between Fairbanks and Nome. Summarized, this schedule will offer five weekly trips to Fairbanks, four to Ketchikan and Juneau, two to Whitehorse and one to Nome.

# DC-8 production moves into full gear

Douglas Aircraft Co.'s DC-8 jet transport production is in full gear at its new 1,000,000 sq. ft. manufacturing facility at Long Beach, Calif.

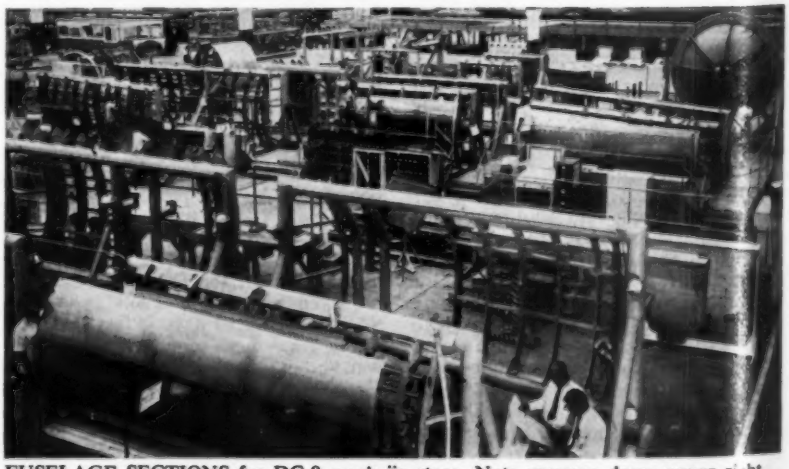
First model of the DC-8 is now scheduled to fly in March 1958. This aircraft, the first off the DC-8 assembly line, will be powered by Pratt & Whitney JT3-C (J57) engines and will be retained by the company for flight test.

Second DC-8, to be powered by the Pratt & Whitney JT4 (J75) engines, will fly in June and later will be delivered to United Air Lines.



DC-8 NOSE SECTION takes shape at Douglas Long Beach plant.

WING PANEL for DC-8 progresses in sub-assembly.



FUSELAGE SECTIONS for DC-8 reach jig stage. Note pressure dome upper right.

# PAA and TWA carry 49% of transatlantic traffic in first half of '57

The two American airlines engaged in translantic operations carried 49% of the passengers both ways between New York and Europe during the first six months of the year. Ten foreign carriers accounted for the remaining 51%.

Pan American World Airways and Trans World Airlines received 48.4% of the eastbound first-class business, 50.2% of the tourist. Westbound the U.S. carriers handled 49.6% of the first-class and 47.9% of the tourist traffic.

Introduction of emigrant fares was the main reason foreign carriers showed such large increases in their westbound business. SABENA's traffic was 172.3% ahead of last year's comparable period; KLM 113%; Lufthansa 94%; SAS 89%. Pan American's gain was 49.9% and TWA's 9.4%.

Eastbound traffic increases were considerably smaller. SABENA again was the top gainer with 42.9%; Lufthansa had an increase of 31.4%; Air France, 26.5%, and SAS 20%. PAA was up 12.9% and TWA decreased 9.3%.

## *Westbound revenue traffic of North Atlantic carriers into New York*

*(First six months, 1957)*

| Carrier | Scheduled Flights | | | | Seating Capacity | | | Revenue Passengers | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | First | Tourist | Mixed | Total | First | Tourist | Total | First | Tourist | Total |
| PAA | 386 | 334 | 732 | 1,452 | 28,234 | 58,245 | 86,479 | 16,887 | 43,206 | 60,093 |
| TWA | 30 | 340 | 377 | 747 | 7,298 | 34,810 | 42,108 | 4,681 | 23,763 | 28,444 |
| **Total U.S.** | 416 | 674 | 1,109 | 2,199 | 35,532 | 93,055 | 128,587 | 21,568 | 66,969 | 88,537 |
| Air France | 26 | 27 | 321 | 374 | 7,456 | 15,881 | 23,337 | 4,632 | 11,927 | 16,559 |
| BOAC | 180 | 94 | 120 | 394 | 10,347 | 12,610 | 22,957 | 6,545 | 10,859 | 17,404 |
| Lufthansa | | 7 | 177 | 184 | 2,324 | 9,796 | 12,120 | 962 | 7,163 | 8,125 |
| EL AL | | 53 | | 53 | | 3,077 | 3,077 | | 1,617 | 1,617 |
| IBERIA | | 1 | 57 | 58 | 1,688 | 2,442 | 4,130 | 269 | 1,117 | 1,386 |
| KLM | 154 | 206 | 37 | 397 | 6,779 | 16,071 | 22,850 | 4,173 | 13,117 | 17,290 |
| LAI | | | 93 | 93 | 1,400 | 4,086 | 5,486 | 264 | 1,277 | 1,541 |
| SABENA | | 69 | 151 | 220 | 2,020 | 11,823 | 13,843 | 960 | 8,476 | 9,436 |
| SAS | 1 | 122 | 273 | 396 | 4,409 | 18,332 | 22,741 | 2,341 | 11,844 | 14,185 |
| SWISS | 27 | 3 | 142 | 172 | 2,707 | 7,658 | 10,365 | 1,775 | 5,430 | 7,205 |
| **Total non-U.S.** | 388 | 582 | 1,371 | 2,341 | 39,130 | 101,776 | 140,836 | 21,921 | 72,827 | 94,748 |
| **Grand total** | 804 | 1,256 | 2,480 | 4,540 | 74,662 | 194,781 | 269,423 | 43,489 | 139,796 | 183,285 |

## *Eastbound revenue traffic of North Atlantic carriers out of New York*

*(First six months, 1957)*

| Carrier | Scheduled Flights | | | | Seating Capacity | | | Revenue Passengers | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | First | Tourist | Mixed | Total | First | Tourist | Total | First | Tourist | Total |
| PAA | 391 | 350 | 749 | 1,490 | 28,370 | 59,159 | 87,529 | 18,665 | 38,715 | 57,380 |
| TWA | 30 | 386 | 376 | 792 | 7,631 | 36,682 | 44,313 | 5,706 | 26,989 | 32,695 |
| **Total U.S.** | 421 | 736 | 1,125 | 2,282 | 36,001 | 95,841 | 131,842 | 24,371 | 65,704 | 90,075 |
| Air France | 27 | 45 | 320 | 392 | 6,980 | 16,848 | 23,828 | 5,290 | 12,139 | 17,429 |
| BOAC | 180 | 89 | 112 | 381 | 10,304 | 12,297 | 22,601 | 7,399 | 7,378 | 14,777 |
| Lufthansa | | 2 | 153 | 155 | 2,281 | 9,467 | 11,748 | 1,228 | 6,854 | 8,082 |
| EL AL | | 60 | | 60 | | 3,054 | 3,054 | | 1,501 | 1,501 |
| IBERIA | | | 59 | 59 | 1,715 | 2,490 | 4,205 | 598 | 1,481 | 2,079 |
| KLM | 142 | 204 | 63 | 409 | 7,131 | 17,305 | 24,436 | 4,217 | 10,635 | 14,852 |
| LAI | | | 94 | 94 | 1,386 | 4,161 | 5,547 | 453 | 2,035 | 2,488 |
| SABENA | | 60 | 148 | 208 | 1,937 | 11,970 | 13,907 | 1,277 | 6,745 | 8,022 |
| SAS | | 122 | 266 | 388 | 4,342 | 18,481 | 22,823 | 3,420 | 10,798 | 14,218 |
| SWISS | 26 | | 143 | 169 | 2,551 | 7,484 | 10,035 | 2,128 | 5,629 | 7,757 |
| **Total non-U.S.** | 375 | 582 | 1,358 | 2,315 | 38,627 | 103,557 | 142,184 | 26,010 | 65,195 | 91,205 |
| **Grand total** | 796 | 1,318 | 2,483 | 4,597 | 74,628 | 199,398 | 274,026 | 50,381 | 130,899 | 181,280 |

## HONORS

Edward Vernon (Captain Eddie) Rickenbacker, board chairman of Eastern Air Lines, will be awarded an honorary Doctor of Science degree, the highest honor the university can bestow, at the Ohio State University's summer quarter commencement, August 30.

Dr. Charles I. Barron, Lockheed Aircraft Corp.'s medical director, has been elected a fellow in the Aero Medical Association for his "outstanding contributions to aviation medicine." He was also installed as president of the Airline Medical Directors Assn.

William J. Samuels, a flight instructor at the Denver pilot training center of United Air Lines, has been named quarterly recipient of the company's Flight Operations Outstanding Award because of his spare-time efforts in preparing a 20-minute slide film documentary on United's methods of pilot training.

Edward P. Curtis, until recently Special Presidential Asst. for Aviation Facilities Planning, was presented Air Force Assn.'s "Aviation Man of the Year" award.

Capt. Reuben L. Wagner of United Air Lines has received the following honors: Post Office Dept.'s Official Merit Citation; Flight Safety Foundation's perfect safety emblem; and Air Line Pilots Association's flying safety award.

Special management and procurement awards have been made to the following officials of the Air Materiel Command: Maj. Gen. William McKee, Vice Commander of AMC, Distinguished Management Award; Gordon Tyler, Deputy Dir. of the Mobile, Ala., Air Materiel Area Procurement and Production, Procurement and Production Management Award; Col. Joseph Fitzgerald, Supply and Services Dir. at the Oklahoma City AMC area, Supply Management Award; and Maj. Phillip Nickell, Quality Control Dir. at Rushmore Air Force Station, S.D., Maintenance Award.

C. C. Pearson, vp-manufacturing Beech Aircraft Corp., has received a Whittier College Alumni Assn. certificate in honor of 30 years of "outstanding achievements" in business. He was member of 1927 class at the California school.

## Honor roll

(For 25 or more years' service in the industry)

D. H. Hollowell, Continental Motors Corp. Vice president-sales and service, Aircraft Engine Div., Muskegon, Mich. (30 yrs.)

Chester G. Miller, Pastushin Industries, Inc. Public relations and advertising mgr., Los Angeles. (30 yrs.)

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# SAM SAINT SAYS

***Will computers replace pilot judgment in ATC?***

AN ASTUTE AND PERCEPTIVE READER (see letter to the editor, AMERICAN AVIATION, August 12, p. 17) put his blunt forefinger on a sensitive question raised in this column on July 15. Clarification is needed.

I did not intend to imply that Mr. Curtis advocates an electronic computer to replace "the pilot's rights and his good judgment." Mr. Curtis has not suggested any change in the pilot-controller relationship.

I did intend to express concern lest Mr. Curtis unknowingly buy a concept of air traffic control that cannot work without ultimate forfeiture of the pilot's prerogative. It is entirely possible for a committee or a team to propose a control concept without realizing that the concept proposed requires transfer of "operational control"" from the pilot to the control agency.

**"Operational control"** is vitally important to pilots and operators. It is the right to say whether or not a flight will operate and to what destination. The loss of this prerogative through the bungling of people who know more about electronics than air traffic control is a very real possibility.

There is a man-bites-dog story in the record to prove it. The Air Transport Association published, about ten years ago, an extensive ATC proposal entitled, "Safe Control of Expanding Air Traffic." The ATA proposal called for pie-in-the-sky: guaranteed landing times. Neither those who drafted the proposal nor those airlines which supported it realized that the primary requirement of such a system was control agency dispatching—a concept abhorrent to pilots and airline operators alike. No one analyzed the proposal carefully enough to discover that you can't guarantee an undisturbed flight for one without agreeing to limit arbitrarily the free choice of others. Believe it or not, the airlines themselves helped sell control agency dispatching to the famous Special Committee-31 of the Radio Technical Commission for Aeronautics.

When the Air Navigation Development Board began turning the blue-sky dreams of SC-31 to electronic reality, airline people woke up with a start. They howled in anguish when told that the control agency would not allow a pilot to take off from Dallas for New York if the New York weather was forecasted to go below limits before arrival. They screamed like wounded eagles when ANDB said that a computer could decide better than a pilot when a flight must divert and to what airport. Surprisingly, none of those bitterly complaining airline people seemed to realize that the Airport Time Utilization Equipment (ATUE) system proposed by ANDB was nothing more or less than implementation of the original ATA proposal.

In 1950 the Air Coordinating Committee's Operational Policy Group (SWG-5) reversed the flow-control philosophy of SC-31 and spelled out a practical method of regulating traffic flow without usurping the pilot's prerogative. But this ACC policy appears to have been forgotten.

**How to control traffic flow** is perhaps the most basic question in air traffic control. Involved is not only the operator's right to say whether a flight will operate and to what destination, but the method of granting landing priority as well.

If the small-size Manhattan Project now getting under way crystallizes wrong decisions on flow control into electronic hardware, years will be lost in air traffic control development. This is not an idle fear. Your reporter has learned from two unimpeachable sources that the Air Force has requested and is considering bids from manufacturers for development of an air traffic control computer to be usable in the Common System. The flow-control requirements to which this computer will be built are essentially the same as the rejected and discredited ATUE computer proposed by ANDB in 1950!!

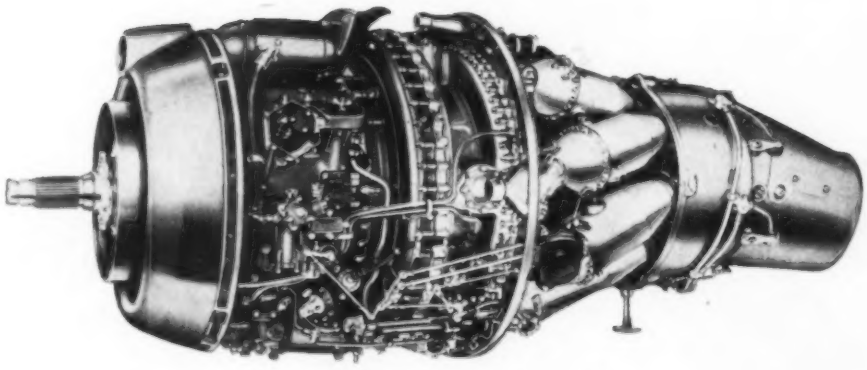
True, there is no visible connection between the proposed Air Force ATC computer project and the Curtis Team.

But the existence of this Air Force project without behind-the-scenes coordination with Curtis and his successors would deny the very purpose for which Curtis was called to the hot seat in Washington.

Our concern is not lessened by the fact that the Curtis System Engineering Team sidestepped the controversial but ultimately inescapable flow-control requirement of ATC. There is nothing in the Curtis proposal to prevent brief excesses of traffic demand from causing the same log-jams we have today.

We're for computers. But computers have to be told what to compute on whose orders.

# ROLLS-ROYCE
# DART
## PROP-JETS



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Washington, D.C., August 26, 1957.

# TRANSPORT TRENDS

***Look for Senate investigators to undertake a thorough scrutiny*** of Military Air Transport Service and its sister sea arm, Military Sea Transportation Service. Authorization of a special subcommittee for the task has been announced by Commerce Committee chairman Warren Magnuson (D-Wash.).

Senate group wants to know if private transport firms can do the same job cheaper. They will attempt to determine whether military transport services have weakened commercial carriers, how much the government may be losing in taxes.

***Order by British European Airways for a few (probably six) Comet 4s*** is imminent. Another BEA jet order may also be announced simultaneously—for the Bristol 200, which will have its four engines mounted aft in twin pods, Caravelle style.

***Airlines can look for little relief for mounting cost of operations,*** particularly in view of CAB regulatory action to force so-called realistic scheduling. Board makes it clear schedule times will have to be lengthened—only 59.4% of flights sampled by its staff in 1956 operated within 15 minutes of timetable. This will mean longer flights, higher fuel consumption, increased flight pay.

*Point being overlooked* is that airline experience shows pilots tend to fly by the timetable, and that majority of flights now being flown "on time" will be forced to operate a longer schedule. Carriers find little solace in Board's switch in position as to how it will administer the new regulations, effective September 20. New part 234 employs elapsed block-to-block time from origination to destination as yardstick, requires carriers to complete at least 75% of flights within 15 minutes of schedule over any three-month period. Initial approach would have applied rules to each flight segment.

***Further evidence of increased interest in Trans World Airlines*** by owner Howard Hughes is the opening of an office on the executive floor at 380 Madison Ave., New York for Ray Cook, one of Hughes' personal attorneys. TWA counsel George Spater, whose main office is with his law firm on lower Broadway, also now has an office at 380 Madison for the first time.

***Of all airline stocks, Western has held up strongest*** through the ups and downs and general decline of 1957. In fact it has remained at its highest point.

***Alitalia will come out on top in the merger of two Italian airlines*** now in the works. New company, to be known as Alitalia-Linee Aeree Italiane probably will retain the participation of TWA, BOAC and BEA in its predecessor companies. DC-7Cs or Britannias probably will be ordered in place of L-1649A for North Atlantic operations.

***Airlines and airframe manufacturers face an uphill fight*** to gain what they feel are realistic jet performance rules. Reason: CAB's recent adoption of new rules apparently represents a blanket endorsement of its staff's views as opposed to those of top airline and airframe engineers.

*Absence of a technical man on Board* continues to prove the major stumbling block to reasonable solution of conflicts between industry and Board's staff on such issues. It is also the most convincing argument for transfer of such safety authority from CAB to new Federal Aviation Agency, as proposed by Presidential aide Edward P. Curtis in final report earlier this year on aviation facilities planning.

***Watch for release of Celler Antitrust subcommittee report on airlines*** before end of the month. Speculation has been rife before, but House unit is ready to move this time, informed sources say.

***Although Sud Aviation is making no announcements,*** it now holds firm orders for more than 30 Caravelles. Officially, only customers are Air France (12) and SAS (6). Among unannounced customers are several more French airlines. On debit side of Caravelle picture, however, is the fact that Pacific Southwest Airlines has not firmed up its option on two aircraft.

# INDUSTRY

## First Fairchild F-27 prototype slated to fly in January after rollout in December; 50 to be built next year

The first prototype of Fairchild's F-27 turboprop transport is expected to be rolled out at Hagerstown, Md., in December and fly in January. Rollout of the first production F-27 will take place in January and will be delivered in March to Mackey Airlines.

Fairchild plans to build a total of 50 F-27s in 1958 and deliver 40 of them. Aircraft will be delivered simultaneously to various customers. For example, while the first production F-27 will go to Mackey, the second will go to West Coast Airlines. Mackey will get its second F-27 toward the end of April while West Coast's six aircraft will run from March through October.

Piedmont Airlines, Fairchild's biggest customer for the F-27, will get its 12 aircraft between April 1958 and October 1958. Bonanza Air Lines' three F-27s will be delivered between May and April, while Venezuela's Avensa will receive its five F-27s between late May and December.

The first executive version of the F-27 will be delivered in October or November 1958. The first RDa7 Dart-powered F-27 will be delivered (to Wien Alaska) in January 1959. Previous aircraft will have the RDa6.

In 1959 Fairchild plans to produce at least 60 F-27s. The company's production capacity is elastic and naturally depends to a large extent on orders, but an output of seven to eight aircraft a month is expected to be reached in October 1958.

At present work is well advanced at Hagerstown on the inner wing panels and part of the fuselage. The Hagerstown plant will assemble the aircraft as well as build the inner wing panels and fuselage. Fairchild's Jonco Aircraft Corp. subsidiary at Shawnee, Okla., is building the empennage and outer wing panels. Grumman and Lockheed-Marietta have supplied a major portion of the fuselage tooling.

Fairchild is being supplied by the British aircraft industry with the engine, propellers and landing gear for the F-27 as well as a certain amount of other equipment including the cabin supercharger. Altogether some $123,000 worth of British equipment will be installed in each of the $590,000 F-27s. Among the U.S.-supplied equipment will be wheels, brakes, electrical items and pneumatic system.

The use of certain different components from those in the Dutch version of the F-27 is not likely to delay certification of the Fairchild aircraft. It should be certificated shortly after the first prototype flies from Hagerstown. CAA has worked closely with the Dutch authorities, Fokker and Fairchild on the entire F-27 program. Dutch certification for the Fokker-built F-27 is expected in October of this year.

The American and Dutch aircraft differ little other than in equipment. The Fairchild-built planes, however, will have greater tankage (1,320 gallons) than those built by Fokker and also will feature a step-door (pneumatically operated) as standard equipment.

TWO PROTOTYPES of Fokker-designed F-27 are flying in Holland. Fairchild and Fokker will both be in full production with aircraft in 1958.

## Controlled drinking aloft no hazard, says Tipton

The Senate Aviation Subcommittee launched hearings on bills aimed at banning alcoholic beverages aloft. The bills (S-4 & S-593) would prohibit serving of drinks aboard commercial or military planes.

ATA president Stuart G. Tipton contended, as he has in the past, that no evidence exists to show controlled drinking a hazard. He cited an ATA survey in which 80% of the passengers answering approved airline liquor policies.

CAB Vice Chairman Chan Gurney testified that the Board has not received "an authentic account of a single incident in which the service of liquor aboard aircraft has adversely affected the safety of air carrier operations."

In an unexpected turn, four National Airlines stewardesses, bearing a petition signed by 87 others, aired objections to the prohibition measures. Air Line Stewardesses Association previously as well as the Air Line Pilots Association have termed drinking aloft dangerous.

ALPA president Clarence Sayen said the group was again backing passage of the legislation, introduced by Senators Strom Thurmond (D-S.C.) and Richard Neuberger (D-Ore.)

Meanwhile, Sen. George Smathers (D-Fla.) announced plans to tack an amendment to the bills that would extend the legislation to CAA-aided airports. Proposal would bar federal grants to airports where alcohol is served.

## Senate approves permanency for U.S.-Alaska carriers

The Senate passed a bill that provided permanent certification of U.S.-Alaska air carriers. It adopted House-passed legislation (H.R. 4520) and sent the bill to the White House.

The action represented a defeat for the Administration. Commerce Secretary Sinclair Weeks had argued that passage "would reverse the considered judgment of the Civil Aeronautics Board and the President of the United States that . . . these routes be authorized for an additional experimental period only."

The Commerce Secretary, according to one report, had approached the Chief Executive about the possibility of a veto.

A statement by Weeks argued that two of the routes involved (Alaska Airlines and Pacific Northern Airlines) are "directly competitive" with permanently certificated routes of Pan American World Airways and Northwest Airlines.

Sen. Warren Magnuson (D-Wash.), who steered the bill through the Senate declared the bill merely "takes care of an item left out of the permanent feeder-line bill of last year."

Alaska Airlines, Pacific Northern Airlines and Northwest's Segment 2

route covering operations between Minneapolis/St. Paul, Edmonton, Can., and Anchorage, Alaska, are affected.

## CAB rejects proposed IATA fare increase

Civil Aeronautics Board has turned down the bid of International Air Transport Assn. for a proposed 5% increase in transatlantic fares and, in a separate order, has extended approval of the present fare structure through March 31, 1958.

CAB's present approval of the agreements, which calls for the introduction of a new low-fare, high-density service, was to have expired September 30.

In its denial of the 5% increase, CAB cited the ability of American carriers "to reduce unit costs in the face of inflationary pressures due in large part to the favorable traffic trends experienced over the North Atlantic route."

Despite the operation of substantial additional capacity, the Board said, North Atlantic carriers in the aggregate realized, during the first six months of 1957, an average load factor of 68.7%, an improvement approximating 14% over the corresponding period of 1956.

## ARDC develops hi-temp synthetic lubricants

A class of high-temperature synthetic lubricants for high speed aircraft and missile engines has been developed by the Air Research and Development Command.

Known as alkylsilanes, they have been perfected to retain lubricating properties at speeds above Mach 2, where bearing temperatures approach 700°F. Laboratory tests have been completed at ARDC's Wright Air Development Center, Dayton, Ohio.

Alkylsilanes are also effective at low temperatures. Tests by WADC have proved them satisfactory at —30°F and efforts are continuing to extend them to —65°F.

Additional work is being conducted to utilize alkylsilanes as hydraulic fluids and base oils for bearing greases.

## High-altitude transports must use flight recorders

All large transports that fly above 25,000 ft. must carry flight recorders after July 15, 1958, under amendments to the Civil Air Regulations adopted Aug. 5 by the Civil Aeronautics Board.

The Board has concluded that a flight recorder of sufficient reliability to fulfill the objectives of such a device is available and that it is "rugged, dependable and will operate months on end without need for calibration."

Backers of the recorders say the instruments might have been of some value in 25% of the accidents studied by the Board.

Twice before CAB called for use of the recorders by amending CAR but each time the order was rescinded because suitable equipment was not available at the time.

## *Latest FIAT G.91 has pylon tanks*

HEAD-ON VIEW shows that external fittings have been "area-ruled" for better transonic performance. Third prototype is being readied for NATO evaluation.

## Boeing gets $139-million contract for Bomarc

Boeing Airplane Co. has received a $139,315,444 contract for inventory production of the IM-99 Bomarc. Contract was placed with fiscal 1957 funds.

Production contract for the rocket-boosted, ramjet weapon follows a $7,109,195 contract placed earlier this year. Earlier award was for continued development of the missile.

## Republic wins contracts for drones systems

Republic Aviation Corp. has received two Army contracts valued at $4,700,000 for development and production of a new service test model of combat surveillance systems.

The contracts call for two systems for aerial drones capable of operating in any kind of weather—one for immediate operational use and one for an advanced type to be operated by Army units in combat areas.

Both drone models are recoverable.

## PAA names RAdm Miller public relations director

RAdm. H. B. Miller (USN ret.), director of information for the American Petroleum Institute since 1948, has been appointed director of public relations for Pan American World Airways, succeeding John Creedy, resigned.

MILLER

Miller served for 20 years in naval aviation following graduation from the U.S. Naval academy. After his retirement he served as executive director of the Congressional Aviation Policy Board.

## Hebert committee puts off engine industry probe

The Hebert Armed Services Investigations Subcommittee dropped its probe of the aircraft engine industry this session of Congress.

Possibility of this move was reported earlier (AMERICAN AVIATION, Airtrend, Aug. 12), but it remained for Chairman Hebert (D-La.) to make it official.

No explanation was given, but some observers think investigators launched the probe too late in the season, forcing them to retreat or face post-adjournment hearings. The Curtiss-Wright Corp. was the only scheduled firm to give testimony during the short-lived investigation.

## Civil aircraft exports up by 85% in 6 months

U.S. exports of civil aircraft weighing under 6,000 lbs. increased more than 85% in value and 45% in units during the first six months of 1957, according to the Aircraft Industries Association.

During the period, 665 aircraft valued at $10,011,678 were shipped abroad, compared with 460, valued at $5,397,546, last year. In June, exports amounted to 105 units valued at $1,485,836.

## R. J. Smith resigns presidency of Slick Airways

Robert J. Smith has resigned as president, director and member of the executive committee of Slick Airways to devote his time to other activities. Delos W. Rentzel, chairman of the board, has assumed the added duties of president and general manager.

Smith had been president since May 1956. He is a brigadier general in the Air Force Reserve, chairman of the 11th Federal Reserve Bank District and was president of Pioneer Airlines before it was merged with Continental.

## Britain's 'over-to-missiles' program will highlight annual Farnborough show, preview discloses

**by James Hay Stevens**

LONDON—Principal interest, if not novelty, at the Society of British Aircraft Constructors' Farnborough show next month will center on the first results of Britain's ten-year missile program. For, in support of its "over-to-missiles" program, the British government is allowing more to be revealed than ever before.

Defense streamlining has led to the current limited production of the *Fairey Fireflash* beam-rider for missile training. One RAF squadron of Supermarine Swift F 7 fighters is now based at Anglesey, Wales, so as to carry out firing practice in the Irish Sea weapon range.

*The de Havilland Firestreak* is an infra-red homer with an internal booster rocket, but is nevertheless still a coaster. It is a rather large, cruciform-pattern missile with a distinctive conical nose, consisting of eight optically-flat, infra-red transparent windows.

De Havilland claims exceptional simplicity of installation, requiring minimum airframe modification and special equipment, plus "unjammable" characteristics. The present model, ordered into production for delivery early in 1959, will be quickly followed by a super Firestreak.

At this writing, *Vickers-Armstrongs* was undecided about showing *Red Dean,* its infra-red AAM, which lost out in the economy cuts after being ordered for production.

*Bristol Bloodhound* is a simple SAM using ramjet propulsion. Although its wing planform resembles that of the Bomarc (there is a Boeing/Bristol technical tie-up) it is an entirely different vehicle, the two Thor ramjets being mounted above and below the body and forming the sole vertical side-area.

There are large horizontal tail surfaces and flight control is on the roll/pitch principle. Internal power is hydraulic with ram-air turbine pump-motivation. Ram-air turbines are likewise used for fuel pumps.

The Ferranti guidance is of the semi-active homing type, that is, the missile locks on the target reflections from a ground-based radar transmission. The Bloodhound WS is essentially integrated with United Kingdom radar coverage. Each battery selects targets and fires the appropriate number of missiles only when the enemy is within computed range.

*English Electric Thunderbird* is a rocket SAM designed specifically for British Army tactical air defense requirements. With its conical nose, cruciform wings and tail blades, it is a near-classical supersonic aircraft. Fully-mobile launching gear and radar make the Thunderbird WS essentially self-contained and rapidly deployable for specific target defense.

*Armstrong Whitworth Seaslug* is also a rocket-propelled SAM of conventional configuration. It has two unusual external features. The cruciform rectangular tail blades are of noticeably greater span than the almost square cruciform wing airfoil. Presumably because of restricted shipboard stowage space, an unusual booster layout has been adopted. Four fin-less dry rockets are mounted concentrically round the forebody, their outwardly-pointing nozzles exhausting between the wings.

Seaslug guidance and launching gear are fundamentally of Royal Navy origin; the ten major contractors working under closer Admiralty control than was the case between the Ministry of Supply and the other missile makers. The SAMs are fired from ship's roll-compensated triple-launchers which are entirely automatically loaded from a magazine below deck. Guidance is SAH, integrated with the ship's radar.

The SBAC's strict all-British rule has been relaxed this year to permit the *Westland Wessex* to fly. The prototype airframe is a Sikorsky-built S-58 with a 1,450-shp *Napier Gazelle* free-turbine. License deliveries of this version of the S-58 for the Royal Navy are slated to begin next fall.

With something like 1,000 lbs. more payload for short hauls than the piston-engined S-58, the Wessex makes an interesting civil proposition. The exceptionally low noise level—at 1,000 feet only blade noise is audible—makes it attractive for city center operation.

After years of endeavor to break the ring, *Aviation Traders* is in the show with its *Accountant.* Originally a DC-3 replacement design, this is now being pushed as a long-range turboprop executive. With two Rolls-Royce Dart RDa6s, it has almost 300-mph cruise, with a pressurized cabin seating 28. As a six-passenger deluxe executive, a 2,500-mile range is offered.

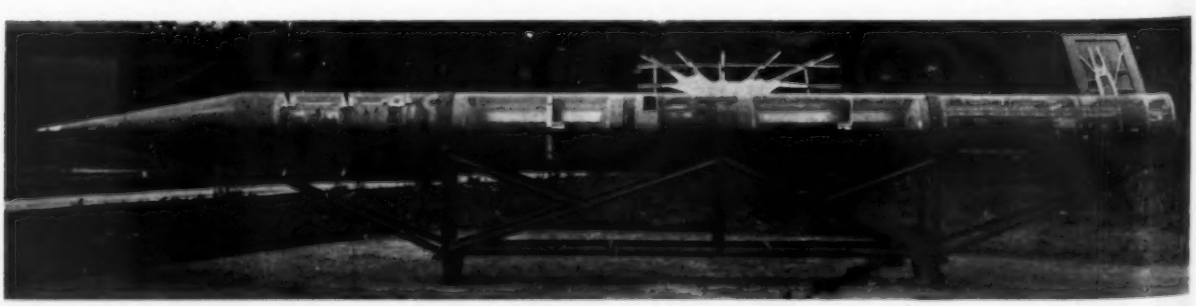
The all-metal *Miles M.100 Student* side-by-side jet trainer is an interesting configuration, but it has arrived late in the jet-trainer market.

*The Saunders-Roe S.R. 53* dual-power research interceptor will climax the flying display—if Security can be persuaded to agree. This tailed delta is powered by one Armstrong Siddeley Viper turbojet and one DH Spectre throttleable HTP/kerosene rocket engine. This airplane is the forerunner of the P.177 to be powered by a D.H. Gyron Junior and a Spectre, an operational design in the Mach 2-plus class.

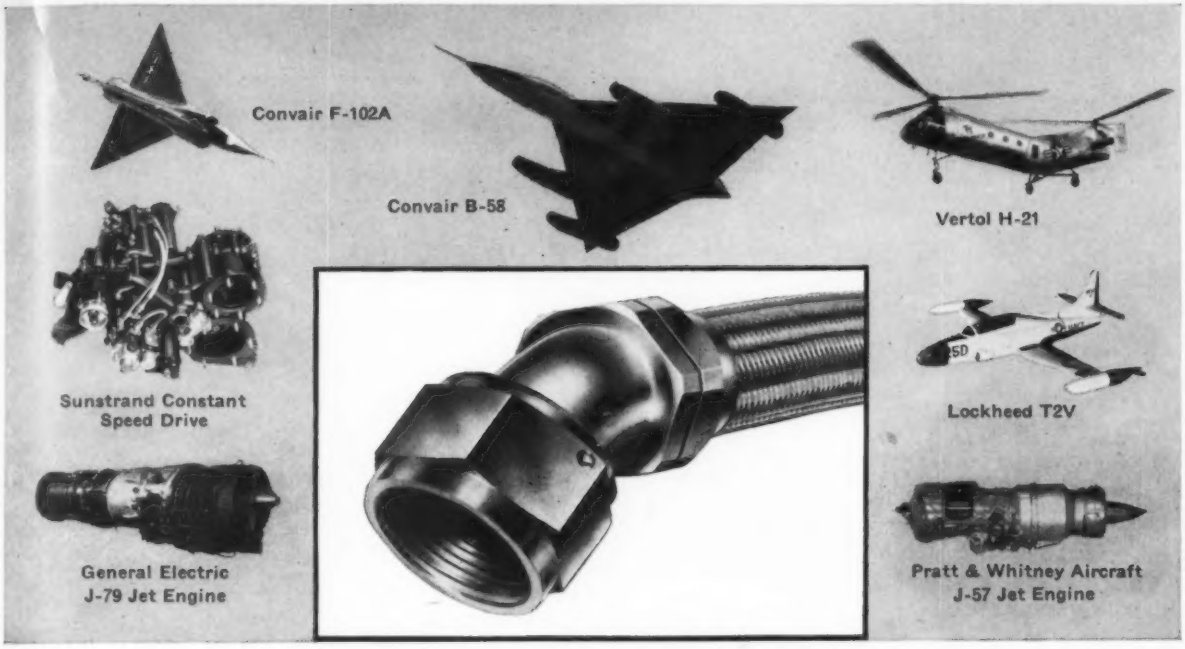
*Rolls-Royce* is flying an Avro Vulcan testbed for the Conway bypass engines ordered for the Handley Page Victor B 2. Since this airplane will fly in a circus with straight-jet types of comparable power it offers a chance to assess the relatively low noise level claimed for the Conway. Rolls-Royce is also expected to demonstrate its jet noise suppressor, probably on a Hunter.

*Hawker Siddeley Group,* in addition to the AW Seaslug missile, is featuring the developed *Gloster Javelin* all-weather fighter with two 10,500-lb.-thrust Armstrong Siddeley Sapphires and armed with four Firestreak missiles. The Bristol Olympus B Ol 6-engined *Avro Vulcan B2* is likely to fly.

*Armstrong Siddeley Motors* is showing the 2,500-lb.-thrust Viper ASV 11 for the first time and is unwrapping two versions of a new shaft-turbine project. The new engine is a 950/1160-shp centrifugal compressor engine of simple construction and low weight. The *P.181* version is a helicopter power-plant, capable of installation in any attitude, with free-turbine power takeoff at the rear. The *P.182* is a single-shaft turboprop variant of the same basic engine.



ARMSTRONG WHITWORTH Seaslug, rocket-propelled SAM developed for Royal Navy, is one of many missiles that are to be shown at annual Farnborough show Sept. 2-6. Four fin-less dry rockets are mounted on forebody.

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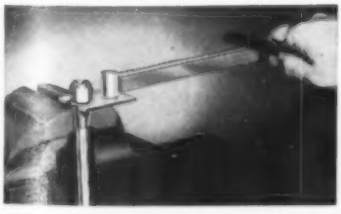

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# How to rent a Russian jet transport

by Anthony Vandyk

WANT TO CHARTER a Tupolev Tu-104 jet? It is quite possible—if you've got the money, Aeroflot's got the time. Information published by the Russian airline shows that it will cost you 15 rubles per aircraft-kilometer to charter one of the 50-seat jets—that's $2.40 per mile at the tourist exchange rate of ten rubles to the dollar.

If for any reason you keep the aircraft waiting between stages of a charter flight it costs you 10,000 rubles ($100) for each day that the aircraft is on the ground awaiting your pleasure.

You can charter a Tu-104 to take you right across the Soviet Union from Moscow to Khabarovsk but Aeroflot will not let you have one to go to the Far North. In the unlikely event that you want to go to these remote parts—and in the even more unlikely event that you get permission to do so—you will have to be content with an Ilyushin Il-14 or Il-12, an Li-2 (DC-3) or a single-engine Antonov An-2.

The reason is that Aerorflot divides Russia into three regions, and at the moment the Tu-104 is available for charter only in the first region. The other four types of aircraft are available in all three regions although the charge varies from region to region.

Region 1 comprises territory located south of the railroad line. Leningrad-Vologda-Molotov-Nizhni-Tagil-Sverdlovsk-Tyumen-Omsk-Krasnoyarsk-Kharbarovsk-Komsomolsk/Amur-Sovetskaya Gavan. (Still with me?) Region 2 consists of territory north of the above railroad line except for the area included in Region 3. This comprises (hold on to your hat) the territory of the Yakutsk autonomous Soviet Socialist Republic and the Chukot, Koryak, Taimyr, Yamalo-Nenets, Evenki and Nenets national areas.

The best aircraft available for charter in all three regions is the I1-14, Russia's standard twin-engine tricycle-geared transport; the rates for the earlier I1-12 are the same. For Region 1 it costs 7 rubles per aircraft-kilometer; for Region 2, 8.50 and for Region 3, 10.50. Waiting time per day for a chartered I1-14 or I1-12 costs 3,000 rubles in Region 1, 3,600 in Region 2, and 4,500 in Region 3. Next down the line is the Li-2 (DC-3) with the cost per aircraft-kilometer per region (daily waiting charge) as follows: Region 1, 5.50 (2,000); Region 2, 7.50 (2,500); and Region 3, 9.50 (3,000). For the An-2 the rates are: Region 1, 4.50 (1,200); Region 2, 5.50 (1,500); Region 3, 7.00 (1,800).

If you are headed for the remoter parts of the Soviet Union be sure that Aeroflot provides you with a "soft-class" aircraft. The charter rates make no reference to this but in fact, on many of the lesser Aeroflot routes, two classes of accommodations are offered on scheduled flights—"hard" and "soft." There is a slightly lower fare for "hard" class which involves travel in aircraft with bucket seats. So, live it up—fly the finest. Insist on getting a "soft-class" I1-14 the next time you want to charter an aircraft to go to Yamalo-Nenets.

## *West German production line*

ONLY AIRCRAFT PRODUCTION LINE rolling in West Germany is at Dornier plant in Friedrichshafen which is manufacturing Do-27 reconnaissance aircraft. Several other companies have orders for military planes but none is yet in production phase.

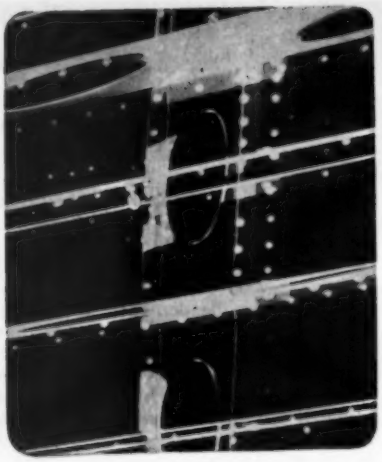
## BRIEFS

**Aerolineas Peruanas,** the new Peruvian airline, has started operations between Lima and Santiago. It is seeking traffic agreements with Aerolineas Argentinas and TAN . . . *Cubana* took delivery of its third L-1049G Super Constellation on August 1 . . . **LOT,** the Polish airline, is negotiating to buy three Convair 240s from SABENA Belgian World Airlines. The U.S. State Department's Office of Munitions Control is understood to have approved the sale. LOT, a member of IATA, is understood to want the Convair 240s to extend its system to all major cities in Western Europe. At the moment, LOT operates a fleet of obsolescent aircraft—Ilyushin I1-12s and I1-14s, and DC-3s.

**Scandinavian Airlines System** will need more than 200 new pilots between now and the end of 1958. On March 1, 1957, it had 550 pilots . . . **Servicios Aereos del Paraguay,** a new carrier, plans to operate two C-46s and three L-49 Constellations on the following routes: Asuncion-Buenos Aires; Asuncion-Montevideo-Buenos Aires; Asuncion-Sao Paulo-Rio de Janeiro; Asuncion-Manaos-Caracas-New York. Later the company hopes to operate across the South Atlantic to North Africa and on through southern Europe and Asia to Tokyo. Another project is for a second route to New York via Lima, Panama and Miami.

**Aer Lingus,** Irish state airline, reports a 1956/1957 gross surplus of $443,934, with a 27% rise in net surplus (before taxation) of $348,866. Revenue passengers totaled 457,600 and freight/mail 7,800 tons. Revenue was up almost 11% to $8,095,937 . . . British aero-engine exports for the first half of 1957 totaled $51,800,000.

**Bristol Aircraft** has now flown six Bristol Sycamore helicopters to Germany out of its Luftwaffe contract for 50 of the rotorcraft.



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# WEST COAST TALK

by Fred S. Hunter

***Reminiscences by and about some old-timers; when Kindelberger sold a design for $140,000***

THE GOOD OLD DAYS: **J. H. (Dutch) Kindelberger,** chairman of North American Aviation, was reminiscing of the time he was chief engineer for the Douglas Aircraft Co. and sold the Navy a new design at $140,000 per airplane. "You can't take a deep breath for $140,000 these days," sighed Kindelberger wistfully.

**Ira Eaker,** vice president of the Hughes Tool Co., refers to an experience of his own to illustrate the integrity of Douglas planes. He recalls that as a young pilot in the Army Air Corps he took delivery of the first O-2 built by Douglas. The plane demonstrated bad spin characteristics in tests. After some discussion, the Air Corps decided to keep the airplane, but placard it with a warning it was not to be spun. But this didn't satisfy Donald Douglas. He issued flat orders that the spin trouble was to be fixed before another airplane was delivered.

**Carl Squier,** vice president of Lockheed Aircraft Corp., tells the story. After he was discharged from the Army Air Corps at Selfridge Field in Michigan, he landed a job with George Prudden, then with Detroit Aircraft Corp., now director of quality control for Lockheed. Squier claims Prudden paid him 40¢ an hour. Prudden claims it was only 35¢. "But," says Squier, "we are now in agreement that whatever it was I wasn't worth it."

**Brig. Gen. Marcus F. Cooper,** new commander of the Air Force Flight Test Center at Edwards Air Force Base, used to be a co-pilot on United Air Lines back in the 30s when UAL flew Boeing 247s. Brig. Gen. Alfred F. Kalberer, now deputy commander of the 15th Air Force, was a United captain. Later, he moved over to KLM and was a pilot for the Dutch carrier in the Far East in the fall of 1941 when a Japanese flier told him: "We'll be at war with you by Christmas." Kalberer relayed the word to Washington, but military intelligence people discounted the story. Three months later Pearl Harbor was bombed and Kalberer was recalled to active duty.

**Sennet W. Gilfillan,** one of the founders of Gilfillan Bros., was captain of the baseball team at Stanford in 1912, and now you know why those bequests to the Palo Alto institution from the Los Angeles electronics leader. But, of course, it's a good school, too.

**Doug Kelley,** now vice president of Pacific Southwest Airlines, ran a flying school in San Diego in the 20s and one of his students was Jimmie Mattern. It cost Jimmie $110 for the three hours and 40 minutes it took him to learn to fly.

**E. M. Lanagan,** who now lives in Altadena, was supply officer of the Aviation Supply Depot at Morrison, Kan. in 1921 and sold more than 1,000 OX5 engines for an average of $32 each. And now a big jet engine—like a P&W J75—will set you back 225,000 smackeroos, cash on the barrel head, and maybe a bargain at that.

**Lloyd Stearman,** the pioneer aircraft manufacturer, now with Lockheed, whose Stearman biplane is still a favorite with crop dusters, says starvation was the big hazard in early-day aviation, but now it's the auto to the airport.

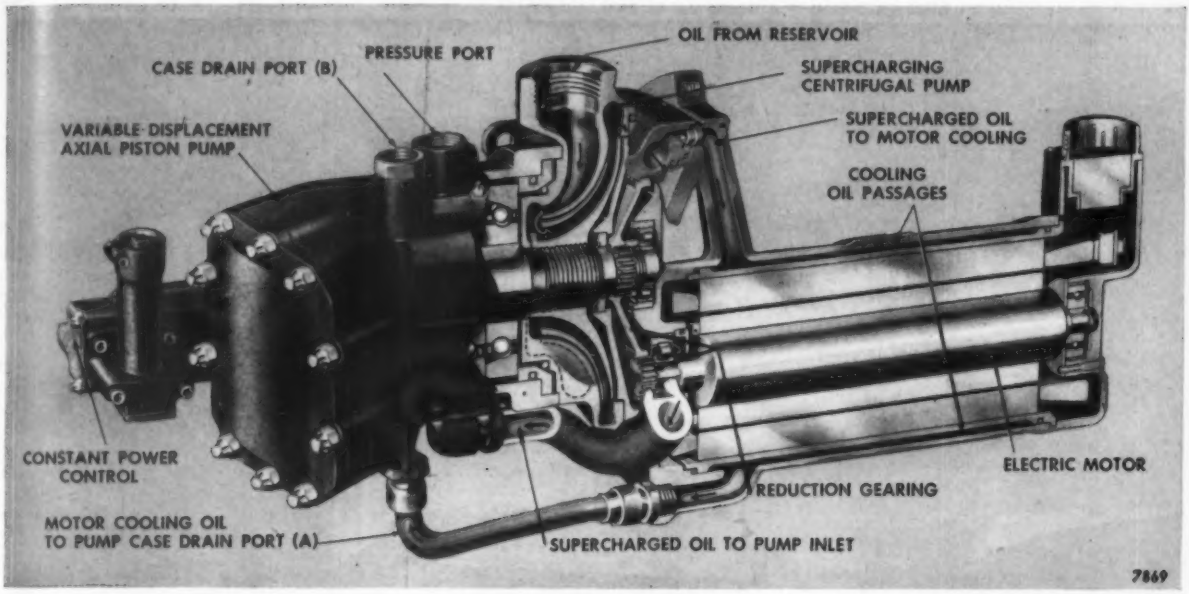
First demonstrations of the mobility of military air forces were made by **Col. Thomas G. Lanphier,** whose son, Col. Thomas G. Lanphier, Jr., is vice president of Convair, in the mid-1920s when he was in command of the Army's First Pursuit Group at Selfridge Field. The elder Lanphier, now living in retirement in San Diego, opened the eyes of the Army with a series of sensational cross-country flights flown with the group's single-engine Curtiss biplanes.

**Cyril Chappellet,** senior vice president of Lockheed, is a former airmail pilot. So is Eddie Bellande, vice president of The Garrett Corp. And Clarence Belinn, president of Los Angeles Airways, got his start with one of the nation's first passenger carriers, the Ludington line that flew between New York and Washington.

Back in the 30s, the then **Northrop** now El Segundo Division of Douglas built a Gamma with a special long landing gear to serve as a flying testbed for the first British Hercules engine and the big prop the new engine would use. The Gamma is long gone, but the Hercules, now much modified, is still in production.

# New Vickers OIL COOLED Motorpump

## For Continuous Duty Applications




### Installed weight approximately 25% less; also offers significant size reduction

The 12 horsepower oil cooled motorpump shown above weighs 31¼ lb and is 20" long overall . . . motor diameter is less than 4". This represents a substantial saving in weight and size over the conventional air cooled motorpump. Also, there is a further saving with the elimination of duct work in the airframe normally required for air cooling the electric motor. The motorpump illustrated *is now in quantity production* for turbine powered transports.

The time-proven Vickers variable displacement piston type pump, which is an integral part of this "package", delivers up to 8 gpm at 2250 psi, reduces to 6 gpm at 2950 psi and zero flow at 3000 psi. These flow and pressure combinations (8 to 6 gpm range) provide constant horsepower for a variety of flight operating requirements. It is designed for *2000-hour* service.

A centrifugal boost pump is located between the pump and the 400 cycle, 200 v electric motor; in addition to supercharging the pump, it circulates oil through the double-walled motor casing. Cooling oil from the motor jacket is discharged into one case drain port (A) . . . then out port (B) to a heat sink. At full pump flow, the impeller provides 2 gpm to the motor casing.

The 12 horsepower unit described above is typical of the Vickers motor and pump combinations now available to the aircraft industry as "packaged power" for continuous duty applications. Remarkable records for reliability in both military and airline service have been established by Vickers designed motorpumps.

#### Higher Overall Efficiency

Overall motorpump efficiency (hydraulic power output to electric current input) is 75%. This is possible only because Vickers Piston Pumps have an overall efficiency of 92%. The more efficient pump means the use of a smaller, lighter electric motor, minimum heat transfer to the hydraulic circuit, and less current drain.

#### Heat Rejection Control

The oil cooled motor design offers a definite advantage in that heat dissipated (140 Btu per minute, maximum) can be conveyed readily to a remotely located heat sink. This is one reason why optimum performance for a given weight and size is more readily achieved in a liquid cooled unit.

#### High Altitude Operation

Motor operation is not affected by low air density since it is not dependent upon air cooling. Inclusion of centrifugal boost pump prevents piston pump cavitation above 30,000 ft, even though reservoir is vented to atmosphere.

#### Constant Power Control

The constant horsepower control shown on the above unit is optional, depending on the application. The control maintains constant 3000 psi pressure as flow increases until the electric motor is loaded to its maximum horsepower. Additional flow is then available at reduced pressure to maintain the same horsepower load on the motor. This type of control is particularly advantageous for low force, high capacity (flow) and high force, low capacity applications while staying within the limits of recommended electric motor load ratings.

#### Packaged Unit

The axial piston pump, centrifugal boost pump, reduction gear and electric motor are all integrated into an exceptionally compact and high-performance package. This concept also permits a high degree of design flexibility to meet individual requirements.

#### Sound Insulated

Because air ducts are not needed to dissipate motor heat, the oil cooled motorpump can be sealed in a compartment and effectively sound insulated.

#### Additional Advantages

Low frictional starting torque characteristics of the 12 horsepower unit permit acceleration to maximum speed in less than 200 milliseconds. The electric motor meets the military specifications for explosion-proof operation.

For further information contact the nearest office listed below.


**VICKERS INCORPORATED**

DIVISION OF SPERRY RAND CORPORATION

**Aero Hydraulics Division**

**Engineering, Sales and Service Offices:**

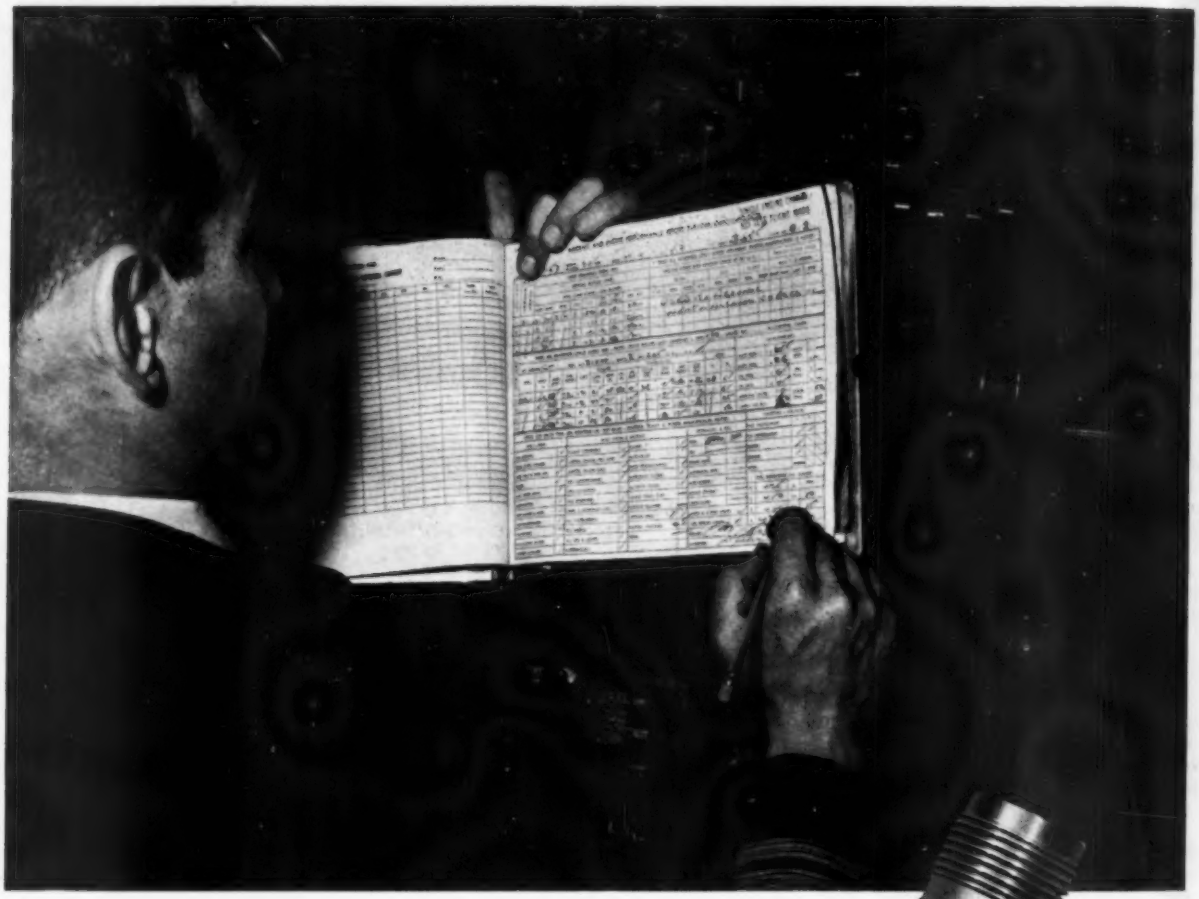
| | |
|---|---|
| **Administrative & Engineering Center** | **3201 Lomita Blvd.** |
| **Detroit 32, Michigan** | **P.O. Box 2003** |
| | **Torrance, California** |

*District Sales and Service Offices:* Albertson, Long Island, N. Y., 882 Willis Ave. • Arlington, Texas, P. O. Box 213 Seattle 4, Washington, 623 8th Ave. South • Washington 5, D.C., 624-7 Wyatt Bldg. • *Additional Service Facilities:* Miami Springs, Florida, 641 De Soto Drive

TELEGRAMS: Vickers WUX Detroit • TELETYPE: "ROY" 1149 CABLE: Videt

OVERSEAS REPRESENTATIVE: The Sperry Gyroscope Co., Ltd. Great West Road, Brentford, Middx., England

# *check out OK* with AC!



AC-285 ILLUSTRATED

***AIRCRAFT AND ENGINE PERFORMANCE REPORTS PROVE SUPERIORITY OF AC AIRCRAFT SPARK PLUGS!***

**You've hit the E.T.A. on the nose . . . the passengers have departed . . . it's time to check out the A.&E.P. Report. It's a routine matter because everything is OK! One reason is AC Aircraft Spark Plugs! The exclusive dual-sealing of AC Aircraft Spark Plugs prevents barrel leakage . . . hot or cold! Ignition delays are dramatically reduced because the products of combustion can't get into the barrel to contaminate the insulating surfaces — attack the ignition leads — short the spark plugs. AC-285s have platinum electrodes for the very finest anti-fouling characteristics! They provide higher heat conduction for smoother idling and peak performance — prevent pre-ignition and ice-bridging and they're less susceptible to lead fouling.**

**AC Aircraft Spark Plugs have been proved in millions of hours of flight in military and airline planes. You'll find them best for the planes you fly!**

**AC SPARK PLUG ⚛ THE ELECTRONICS DIVISION OF GENERAL MOTORS**

*FLYING STARTS with* GM GENERAL MOTORS

**AC**

**AIRCRAFT SPARK PLUGS**

***DISTRIBUTED BY:*** **Airwork Corporation:** Millville, New Jersey; Miami Springs, Florida; Newark, New Jersey; Atlanta, Georgia; Alexandria, Virginia; Cleveland, Ohio. **Pacific Airmotive Corporation:** Burbank, California; Seattle, Washington; Oakland, California; Kansas City, Kansas; Denver, Colorado; Linden, New Jersey. **Southwest Airmotive Company:** Dallas, Texas; Kansas City, Kansas; Denver, Colorado. **Standard Aero Engine Ltd.:** Winnipeg, Manitoba; Vancouver, B.C.; Edmonton, Alberta. **Van Dusen Aircraft Supplies, Inc.:** Chicago, Illinois; Minneapolis, Minnesota; Teterboro, New Jersey; East Boston, Massachusetts; Alexandria, Virginia; Richmond, Virginia.

### Slightly delayed

Bristol Aeroplane Co. top officials have had their formal induction and indoctrination into the ways of doing business with TWA-owner Howard Hughes. When they flew a Britannia to Montreal for demonstrations, Hughes asked that the plane be ready for takeoff at 2 a.m. So all Bristol officials were on hand for Mr. Hughes' arrival. Except that Mr. Hughes, as is frequently his custom, didn't show. Three successive all-night vigils followed. On the fifth night he finally showed up and began a series of flights.

### Rugged instruments

A sun position indicator, developed by Lockheed's Missile Systems division for use in flight tests of its X-17 ballistic research missile, has proven its ruggedness after being slammed into the desert near Holloman Air Development Center, Alamogordo, New Mexico, at a force estimated to be more than 1,000 Gs.

Although it had been buried 12 feet in the sand by the impact, the instrument continued to function perfectly with its own power source for several weeks after the test vehicle had been recovered by tracking a radioactive tracer in the missile nose section.

The sub-miniature, transistorized indicator weighs only two ounces and is used in connection with pitch, yaw and roll-rate information during all X-17 flights.

### On Western style

Although the corporate name remains Western Air Lines, this carrier has now adopted Western Airlines for advertising and other purposes.

### No nonskeds to Alaska

Remember the ruckus over nonsked competition between Seattle and Alaska only a few years ago? Today there isn't a nonsked in business on that route except for occasional charters. Reason? The scheduled carriers have such low fares that charter trips actually cost 10% more.

### Operational hazards

Myron W. Reynolds, vp-operations for Bonanza Airlines, reports one of the rarer varieties of operating problems faced by local airlines in serving small communities.

About 3 o'clock one recent Sunday afternoon Bonanza's "H"-type naviagtion marker located on Kingman, Ariz., airport suddenly became inoperative. A radio technician, dispatched to the scene to restore the facility to operation, found on arrival that all was in good working order . . . but the five telephone poles which supported the antenna had been neatly sawed off about two feet above ground.

Intensive investigation by Bonanza personnel at Kingman turned up the evidence that the local "little league" baseball diamond is now lighted from poles that bear some suspicious looking insulators and gear of the type used for mounting radio antennas.

### For easy reading

One of the newer aeronautical engineering volumes, "Aerodynamic Components of Aircraft at High Speeds," (p. 317), states, "Since an exact solution of the general problem presents almost insurmountable difficulties, it is therefore prudent to narrow the discussion to certain particular cases which may be given an analytic treatment not excessively complex."

Translation: We're stumped . . . let's try something easier.

### Fine month for PSA

Pacific Southwest Airlines, California intrastate carrier that recently announced it intended to buy two French Caravelle jets, had the best month in its history in June, carrying 22,000 passengers. It has doubled its passenger facilities at Lockheed Air Terminal by adding the ticket counter space Trans American Airlines gave up when it ceased operations.

### Good law for pilots, coyotes

Minnesota's three-year-old law requiring check flights for aerial hunters of predatory animals apparently is working for both pilots and coyotes. State's Department of Aeronautics reports fewer accidents—and fewer coyotes taken. Hunters have bagged only one coyote in three years, but are doing better in other categories. Last year's tally: 4,448 red and gray foxes, 215 wolves, 15 bobcats, no coyotes.

### Sad state of the art

One often wonders why the airlines and military don't come up with some simple shock or landing load recorder that would accurately pin down whether or not a hard or overweight landing really justifies all the extensive structural checks such incidents now call for.

### A strange decision

Air Weather Service just happened to get on the roster of the shift of Military Air Transport Service from Andrews to Scott AFB by mistake, but when top USAF officials noted the error, they decided not to change it. Decision, however, has strange implications in the light of recommendation by Presidential Aide Edward P. Curtis for consolidation of military and U.S. Weather Bureau aeronautical forecasting activities.

### Industry talk . . .

Wonder who in Stanford Research Institute looked over the topic listing on that recent card circulated to update its mailing lists. Especially the "electornics" and "physcis" fields everybody is so interested in.

• • •

Britain's Napier company has pulled a smart publicity stunt in getting from CAA the registration N 340EL and N 440EL for the two Convairs, a 340 and 440, that are to be certificated for use with the Eland turboprop as powerplants.

• • •

New Zealand National Airways apparently carries plenty of gun-toting passengers. Information published by the airline for the benefit of travelers has this to say about firearms: "If you are taking a firearm, remove the bolt, hand it to Traffic Dispatch Officer before emplaning and collect on arrival at destination airport."

• • •

One major European airline which is consistently in the red avoids arousing too much criticism by releasing its annual report in early August when everyone who is anyone is on vacation.

DOUGLAS ALBUM. T. E. (Eric) Springer (left), who retires as vp-general manager of Douglas Aircraft's El Segundo Div. Sept. 1, is shown with Donald W. Douglas in photo taken in early 1920s when Springer flew the planes Douglas designed. Springer, wearing test pilot garb of the era, was one of six original Douglas employes.

Giant landing gear test facility is 60 feet high. It simulates conditions that heavy, high-speed planes actually meet.

# BENDIX SHOOTS LANDINGS INDOORS TO HELP PRODUCE BETTER LANDING GEAR SYSTEMS

When designing and producing complete landing gear systems it is vitally important to know in advance just how every component part will respond to the stresses and strains of flight conditions.

That's why the giant landing gear testing equipment pictured above plays such an important part in the development and production of Bendix* complete landing gear systems.

All major components that make up the system such as control valves, nose wheel steering, retractor actuators, power braking as well as wheels, brakes, shock absorbing struts and even tires are subjected to repeated tests of braking, dropping, twisting and vibration before final approval.

For Bendix has proven over many years that landing gear components that have been designed, engineered and tested to work together give better and more dependable performance than any arbitrary assembly system.

So, when it comes to gear for landing, think and plan in terms of a complete landing gear system. Then, we suggest you think of Bendix and Bendix Products Division at South Bend, Indiana.

*REG. U.S. PAT. OFF.

Bendix PRODUCTS DIVISION South Bend, IND.

Bendix AVIATION CORPORATION

Circle No. 16 on Reader Service Card.

# Summary of U.S. airline traffic for June 1957, vs. June 1956

***Compiled by American Aviation Publications from Official C.A.B. Data***

| Airlines | Revenue Passengers | | | Revenue Passenger Miles (In Thousands) | | | Total Ton-Miles Rev. Traffic | | | % Available Ton-Miles Used | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1957 | 1956 | % Change | 1957 | 1956 | % Change | 1957 | 1956 | % Change | 1957 | 1956 |
| **DOMESTIC** | | | | | | | | | | | |
| American | 708,331 | 743,822 | —4.8 | 503,285 | 482,035 | 4.4 | 57,673,567 | 53,900,563 | 7.0 | 65.1 | 65.1 |
| Braniff | 177,423 | 156,538 | 13.3 | 79,997 | 64,926 | 23.2 | 8,562,018 | 6,948,862 | 23.2 | 50.1 | 58.2 |
| Capital | 371,659 | 281,362 | 32.1 | 145,437 | 98,630 | 47.5 | 14,953,473 | 10,163,406 | 47.1 | 51.5 | 50.0 |
| Continental | 74,605 | 62,504 | 19.4 | 35,117 | 23,005 | 52.6 | 3,632,119 | 2,411,910 | 50.6 | 50.4 | 48.4 |
| Delta | 231,249 | 208,951 | 10.7 | 113,873 | 98,416 | 15.7 | 12,242,819 | 10,640,517 | 15.1 | 60.7 | 60.4 |
| Eastern | 672,338 | 671,019 | 0.2 | 365,739 | 321,922 | 13.6 | 38,087,821 | 35,057,539 | 8.6 | 47.3 | 51.0 |
| National | 114,287 | 105,916 | 7.9 | 69,580 | 69,511 | 0.1 | 7,473,522 | 7,729,785 | —3.3 | 55.5 | 71.8 |
| Northeast | 71,256 | 59,985 | 18.8 | 20,502 | 12,095 | 69.5 | 2,055,421 | 1,149,602 | 78.8 | 49.5 | 60.2 |
| Northwest | 136,560 | 134,938 | 1.2 | 102,515 | 95,148 | 7.7 | 11,243,079 | 10,570,429 | 6.4 | 59.7 | 61.5 |
| TWA | 435,712 | 398,113 | 9.4 | 368,118 | 325,037 | 13.3 | 39,122,149 | 34,512,587 | 13.4 | 65.5 | 69.6 |
| United | 594,131 | 618,875 | —4.0 | 465,506 | 446,730 | 4.2 | 52,608,031 | 50,180,125 | 4.8 | 63.5 | 66.4 |
| Western | 124,455 | 97,638 | 27.5 | 66,023 | 49,824 | 32.5 | 6,880,489 | 5,214,650 | 31.9 | 60.2 | 62.2 |
| TOTALS | 3,712,006 | 3,539,660 | 4.8 | 2,335,692 | 2,087,279 | 11.9 | 254,534,508 | 228,479,975 | 11.4 | 58.8 | 68.8 |
| **TERRITORIAL SERVICE** | | | | | | | | | | | |
| Carifair | 16,570 | 13,824 | 19.8 | 1,177 | 1,014 | 16.1 | 126,635 | 94,647 | 33.8 | 57.3 | 57.4 |
| Hawaiian | 41,737 | 45,393 | —8.1 | 6,304 | 6,453 | —2.3 | 669,126 | 680,990 | —1.7 | 60.7 | 58.4 |
| Trans-Pac. | 17,635 | 24,685 | —28.6 | 3,028 | 3,128 | —3.2 | 252,343 | 246,506 | 2.4 | 61.9 | 51.2 |
| **INTERNATIONAL** | | | | | | | | | | | |
| American | 11,921 | 11,202 | 6.4 | 8,332 | 7,699 | 8.2 | 1,195,324 | 1,098,755 | 8.8 | 64.8 | 66.0 |
| Braniff | 4,148 | 2,610 | 58.9 | 9,138 | 5,785 | 57.9 | 1,087,877 | 742,246 | 46.6 | 50.2 | 54.4 |
| Delta | 5,769 | 4,851 | 18.9 | 7,580 | 5,855 | 29.5 | 904,020 | 648,670 | 39.4 | 59.5 | 51.9 |
| Eastern | | | | | | | | | | | |
| San Juan | 26,879 | 20,039 | 34.1 | 38,627 | 28,026 | 37.8 | 4,149,341 | 3,112,266 | 33.3 | 63.7 | 62.7 |
| Bermuda | 4,966 | 5,530 | —10.2 | 4,015 | 4,077 | —1.5 | 418,283 | 448,156 | —6.7 | 54.2 | 65.0 |
| National | 6,497 | 8,843 | —26.5 | 4,563 | 4,476 | 1.9 | 525,269 | 501,681 | 4.7 | 45.5 | 48.1 |
| Northwest | 11,786 | 11,309 | 4.2 | 25,862 | 22,489 | 15.0 | 4,347,026 | 4,261,276 | 2.0 | 73.6 | 73.2 |
| Hawaiian | 1,386 | 1,246 | 11.2 | 3,675 | 3,200 | 14.8 | 410,948 | 365,133 | 12.5 | 59.2 | 68.3 |
| Panagra | 11,489 | 11,399 | 0.8 | 14,329 | 13,146 | 9.0 | 1,891,054 | 1,775,277 | 6.5 | 57.4 | 56.1 |
| Pan American | | | | | | | | | | | |
| Lat. America | 107,099 | 104,502 | 2.5 | 122,772 | 103,414 | 18.7 | 15,261,432 | 13,217,914 | 15.5 | 63.5 | 62.7 |
| Atlantic | 115,076 | 102,921 | 11.8 | 168,274 | 135,053 | 24.6 | 20,452,052 | 16,675,405 | 22.6 | 65.5 | 60.5 |
| Pacific | 27,149 | 29,597 | —8.3 | 101,225 | 83,784 | 20.8 | 12,663,551 | 10,875,882 | 16.4 | 68.5 | 73.8 |
| Portland/Seattle-Honolulu | 1,992 | 1,927 | 3.4 | 5,542 | 5,166 | 7.3 | 607,530 | 518,437 | 17.2 | 48.1 | 69.0 |
| Alaska | 9,355 | 8,890 | 5.2 | 10,190 | 9,851 | 3.4 | 1,382,356 | 1,459,598 | —5.3 | 57.1 | 63.4 |
| TWA | 31,868 | 31,132 | 2.4 | 87,537 | 83,119 | 5.3 | 10,489,107 | 10,150,994 | 3.3 | 69.6 | 71.0 |
| United | 11,897 | 12,380 | —4.0 | 29,543 | 30,711 | —3.4 | 3,174,288 | 3,307,338 | —4.0 | 69.3 | 80.6 |
| TOTALS | 485,,899 | 365,205 | 33.0 | 631,987 | 537,485 | 17.6 | 77,940,980 | 68,275,458 | 14.2 | 65.5 | 65.7 |

NOTE: Northwest Hawaiian and PAA Honolulu figures shown for information only; individual carrier totals include these figures.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **LOCAL SERVICE** | | | | | | | | | | | |
| Allegheny | 44,140 | 42,425 | 4.1 | 7,721 | 7,142 | 8.1 | 777,181 | 712,823 | 9.0 | 47.2 | 47.9 |
| Bonanza | 12,235 | 11,650 | 5.0 | 2,672 | 2,562 | 4.3 | 268,930 | 256,652 | 4.8 | 45.5 | 44.9 |
| Central | 11,634 | 9,441 | 23.2 | 2,340 | 1,746 | 34.0 | 236,851 | 178,491 | 32.7 | 35.6 | 32.2 |
| Frontier | 19,855 | 18,158 | 9.3 | 5,256 | 4,845 | 8.5 | 593,176 | 548,110 | 8.2 | 62.2 | 62.9 |
| Lake Central | NR | 13,133 | — | 2,286 | 2,030 | 12.6 | 235,324 | 195,985 | 20.1 | 41.8 | 42.2 |
| Mohawk | NR | 34,639 | — | 7,505 | 6,217 | 20.7 | 761,985 | 617,619 | 23.4 | 51.6 | 59.8 |
| N. Central | 63,979 | 55,817 | 14.6 | 10,581 | 9,467 | 11.8 | 1,065,927 | 947,051 | 12.6 | 50.6 | 52.4 |
| Ozark | 38,195 | 30,453 | 25.4 | 6,289 | 4,739 | 32.7 | 646,763 | 478,813 | 35.1 | 46.1 | 42.4 |
| Piedmont | 39,854 | 40,062 | —0.5 | 8,524 | 7,669 | 11.1 | 855,694 | 773,061 | 10.7 | 60.7 | 59.0 |
| Southern | 19,277 | 16,395 | 17.6 | 3,479 | 2,863 | 21.5 | 352,587 | 295,381 | 19.4 | 40.1 | 45.6 |
| Southwest | 30,902 | 24,147 | 27.9 | 6,584 | 4,608 | 42.9 | 649,207 | 460,795 | 40.9 | 57.4 | 43.4 |
| Trans Texas | 21,718 | 19,976 | 8.7 | 5,083 | 4,556 | 11.6 | 526,783 | 479,102 | 10.0 | 41.2 | 37.9 |
| West Coast | 24,551 | 20,342 | 20.7 | 4,358 | 3,582 | 21.7 | 428,035 | 335,333 | 27.6 | 51.8 | 54.9 |
| TOTALS | 326,340 | 336,638 | —3.1 | 72,678 | 62,026 | 17.2 | 7,398,443 | 6,279,216 | 17.8 | 49.5 | 48.9 |
| **HELICOPTER SERVICE** | | | | | | | | | | | |
| Chi. Helicopter | 5,405 | — | — | 80 | — | — | 10,201 | 2,755 | 270.3 | 34.1 | 44.3 |
| Los Angeles | 2,805 | 1,806 | 55.3 | 102 | 70 | 45.7 | 14,558 | 12,691 | 14.7 | 62.8 | 53.8 |
| N. Y. Airways | 7,214 | 4,373 | 65.0 | 131 | 82 | 59.8 | 15,927 | 10,492 | 51.8 | 43.6 | 66.9 |
| **ALASKAN SERVICE** | | | | | | | | | | | |
| States/Alaska | 707 | 835 | —15.3 | 1,170 | 1,363 | —14.2 | 314,636 | 447,259 | —29.6 | 41.9 | 51.1 |
| Alaska Intra | 5,171 | 5,526 | —6.4 | 1,484 | 1,500 | —1.1 | 352,006 | 533,631 | —34.0 | 49.5 | 50.4 |
| Alaska Coastal | 5,865 | 5,501 | 6.6 | 499 | 491 | 1.6 | 58,638 | 58,841 | —0.3 | 61.2 | 61.3 |
| Cordova | NA | 1,910 | — | NA | 269 | — | NA | 221,509 | — | NA | 56.7 |
| Ellis | 7,247 | 7,018 | 3.3 | 380 | 358 | 6.1 | 43,594 | 41,999 | 3.8 | 64.8 | 59.8 |
| N. Consolidated | 2,782 | 2,450 | 13.6 | 867 | 797 | 8.8 | 201,136 | 289,811 | —30.6 | 62.7 | 70.7 |
| Pacific Northern | 12,733 | 14,258 | —10.7 | 13,598 | 11,326 | 20.1 | 1,886,684 | 1,611,719 | 17.1 | 67.6 | 68.0 |
| Reeve | 1,140 | 944 | 20.8 | 870 | 459 | 89.5 | 137,858 | 117,353 | 17.5 | 43.2 | 64.2 |
| Wien Alaska | 3,800 | 4,066 | —6.5 | 1,259 | 1,753 | —28.2 | 405,670 | 1,595,291 | —74.6 | 67.6 | 93.3 |
| TOTALS | 39,445 | 42,508 | —7.2 | 20,127 | 18,316 | 9.9 | 3,400,222 | 4,917,473 | —30.9 | 60.1 | 68.7 |

NR—Not reported.
NA—Not available.

## FACILITIES

**Precision Equipment Co., Inc.**, has moved to larger facilities at 1740 Crenshaw Blvd., Torrance, Calif.

**Valpey Corp.** has completed its new product development and testing laboratory which is fully equipped with the latest testing and measuring devices.

**Lynn Engineering Co.** has acquired more than 6,000 sq. ft. in plant space at San Carlos, Calif. Facility will be used for manufacture of newly-developed Lynnco Air Curtain blast fence.

**Wilcox Electric Co.** has established sales offices at Wichita, Kansas City and Hollywood, Calif. Offices will provide airframe manufacturers in areas with technical information and assistance.

**Minneapolis-Honeywell Regulator Co.** has established a Military Products Group to meet management, manufacturing and engineering needs of military's defense programs.

**Consolidated Electrodynamics Corp.** has established an Analytical and Control Instrument Division to consolidate company activities in the design, development and manufacture of the instruments.

**The Deutsch Co.** has formed an independent affiliate to serve the aircraft industry. Deutsch Fastener Corp. will have responsibility for engineering and marketing of company's drive-pin blind rivets.

**RUGGED OPERATOR**—Unloading a jeep in rough terrain, this Marine Corps Sikorsky S-56 shows its usefulness under field conditions during Fleet Introduction flights at Quantico. The Marine Corps has organized its first S-56 squadron, HMR (M)-461, at New River, N. C. The big, twin-engined S-56, which can carry 26 men and their gear, is flown as the HR2S-1 by the Marine Corps and as the H-37 by the Army.

# AROUND THE WORLD WITH SIKORSKY HELICOPTERS

**THE OLD AND THE NEW**—One of the last of the Army's mules and its rider from the 35th QM Co. (Pack) meets a Sikorsky S-58 (Army H-34) bringing in rations during maneuvers near Camp Hale, Colo. The Army has announced deactivation of mule-equipped units and the creation of new helicopter companies.

**MATERNITY MISSION**—Racing the stork, a U. S. Air Force Sikorsky H-19 based at Prestwick, Scotland, flew a critically ill expectant mother from the isolated Isle of Arran across the Firth of Clyde to a hospital normally eight hours away by boat. The mother recovered; the baby girl weighed 8½ pounds.

**TO DOWNTOWN CHICAGO**—Sikorsky helicopters flown by Chicago Helicopter Airways are now operating on convenient, frequent schedules connecting Midway Airport, O'Hare International Airport, and Meigs Field, adjacent to the Chicago Loop. New 12-passenger Sikorsky S-58s are joining the fleet of S-55s already in service in Chicago. Sikorsky helicopters are also standard in scheduled helicopter passenger service in New York and Los Angeles, and in Europe.

## HELICOPTER HISTORY

### FIRST MERCY MISSION

On January 3, 1944, a U. S. Coast Guard Sikorsky R-4 piloted by Comdr. F. A. Erickson flew from Manhattan to Sandy Hook with two cases of blood plasma for survivors of a destroyer explosion. The R-4 made the flight in 14 minutes when other aircraft were grounded by weather and a boat would have taken an hour. The plasma was immediately administered to burn and shock victims. This was the first of the many thousands of helicopter mercy missions.

**SIKORSKY AIRCRAFT**
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# PEOPLE

**Gen. Thomas S. Power,** commander of USAF Strategic Air Command, is shown at controls of the supersonic Convair B-58 bomber during recent visit to Convair-Ft. Worth. At left is August C. Esenwein, Convair vice president and manager of the Ft. Worth plant. At right is B. A. Erickson, manager of flight and chief test pilot at the plant. ⟶

**KLM Royal Dutch Airlines** has ordered a Lockheed 1049H Super Constellation and 12 Electra turboprops. Frits Besancon (left), executive vice president of KLM, recently visited Lockheed with other executives of the airline to inspect production. He is shown with Max van der Heyden, traffic staff member. On stairway are G. de Jong and W. F. Beekink, both of KLM. The airline has two other 1049H convertible cargo-passenger transports on option.
⟵

CHILTON

KROON

BERRY

REDDING

SCHLOESSER

**Westinghouse Electric Corp.** has established a new advanced design and development center at Kansas City for long-range programs as a department of the Aviation Gas Turbine Division. Allan Chilton, former chief engineer of the jet engine plant, is manager; R. P. Kroon is chief engineer, and A. H. Redding is assistant chief engineer. As a result of establishing the new department, D. W. Berry moves up to chief engineer of the Aviation Gas Turbine Div., and V. V. Schloesser takes over as assistant chief engineer of the division.

MONCHER

PETERSON

RAUSCHENBACH

FAGAN

TIMBERLAKE

COLODNY

## MANUFACTURING

| Name | New Position | Former Position |
|---|---|---|
| Frank L. Moncher | Dir. engrg., Aero Hydraulics Div., Vickers, Inc. | Chief engr. |
| W. Jerome Peterson | Chief design engr., Chandler-Evans div., Pratt & Whitney Co. | Chief pump engr. |
| G. J. Rauschenbach | Dir. sales, The Martin Co., Denver Div. | Sales mgr., missile projects, Baltimore. |
| Dr. Arne Wikstrom | Special tech. asst. to pres., Research and Advanced Devel. Div., Avco Mfg. Corp. | Project engr., electronic airborne systems and shipborne navigational systems. |
| Louis E. Fagan | Sr. vp, Clifton Precision Products Co. | VP-manufacturing. |
| Arnold R. Hayes | P, secy. and gen. mgr., Clifton Precision Products Co. | Secy. and gen. mgr. |
| Thomas W. Shoop | VP-sales, Clifton Precision Products Co. | Sales and adv. mgr. |
| Robert G. Schmidt | Project mgr., new Lawrence plant, Callery Chemical Co. | Various supervisory capacities. |
| W. G. Wade | Head, The Janco Laboratory | From The Standards Laboratory, Los Angeles Dept. of Water and Power |
| Gerald J. McCaul | VP-contracts and service, Simmonds Aerocessories, Inc. | Mgr. contracts and service div. |
| Myron G. Domsitz | VP-research and devel., Simmonds Aerocessories, Inc. | Chief engr., R&D. |
| Robert J. Lang | VP, Aircraft Engrg. & Maintenance Co. | Asst. to pres. |
| Llewellyn C. Schuler | Sr. project engr., HU2K-1, Kaman Aircraft Corp. | Engineer. |
| Robert D. Moses | Sr. project engr., HOK-1 and HUK-1, Kaman Aircraft Corp | Engineer. |
| Donald W. Robinson | Sr. project engr., special projects, Kaman Aircraft Corp. | Engineer. |
| Robert C. Mack | Sr. project engr., robot helicopters, Kaman Aircraft Corp. | Engineer. |
| Chester C. Utz | Exec. engr., Chrysler Corp.'s Defense Operations Div. | Chief engr. |
| Ted Grohs | Prospectus engr., On Mark Engrg. Co. | Engr. Aircraft Div. |
| Lt. Gen. Patrick W. Timberlake | Corporate vp, Northrop Aircraft, Inc. | Cmdr. Allied Air Forces, Southern Europe. |
| Milton M. Kanter | Asst. to vp and secy., Ford Instrument Co. | Asst. to pres., David Bogen Co. |
| Larry S. Winston | Sales engrg. mgr., Test Equipment Div., Greer Hydraulics, Inc. | Chief project engr., R&D. |
| Arthur H. Jones | VP-defense planning, Avco Mfg. Corp. | Gen. mgr., Military Electronics Center, Motorola Co. |
| Ralph R. Hind | VP and gen. mgr., Edo (Canada) Ltd. | Royal Canadian Navy. |
| Dr. Raymond L. Garman | Chm. bd., General Precision Laboratory, Inc. | Exec. vp and tech. dir. |
| James W. Murray | Pres. and chief exec. officer, General Precision Laboratory, Inc. | Exec. and gen. mgr. |
| S. H. White | Master scheduling mgr., Lockheed Aircraft, Marietta | Chief planning engr. |
| E. J. Schon | Chief planning engr., Lockheed Aircraft, Marietta | C-130 planning dept. mgr. |
| W. W. Fox | Spec. asst. F-102/F-106, Convair | Sr. project engr., F-102A Delta Dagger. |
| Gladyn H. Putt | Exec. asst. to L. Eugene Root, corporate vp and gen. mgr. Missile Systems div., Lockheed Aircraft | Exec. asst. to pres., Rand Corp. |
| Dr. Ernst A. Steinhoff | Dir. Air Force missiles dept., Aerophysics Development Corp. | Tech. dir., Holloman Air Development Center. |
| Philip D. Terry | Regional mktg. mgr., Aircraft & Missile Products, eastern states | With Wm. R. Whitaker Co. |

## AIRLINES

| | | |
|---|---|---|
| Edwin I. Colodny | Asst. to the pres., Allegheny Airlines | Civil Aeronautics Board Staff. |
| Felix Preeg | Atlantic operations mgr., The Flying Tiger Line | Retired captain, TWA. |
| Douglass F. Johnson | Exec. vp, Transocean Air Lines | Pres., Aircraft Engrg. and Maintenance Co. |
| Wirtley P. Scruggs | Asst. to Robert Ramspeck, VP-federal and state regulatory matters, Eastern Air Lines | Asst. to first vp Paul Brattain. |
| Frank Mulvey | Dir. interline reservations procedure office, Air Traffic Conference | Dir. reservations, Allegheny Airlines. |
| Stephen N. White | Dir. training, Western Air Lines | Ind. rel. instructor, Loyola Univ. |
| L. Thomas Ferguson | Dir. reservations, Allegheny Airlines | In reservations and sales. |
| James G. Redden | Reservations supt. U.S.A., for British Overseas Airways Corp. | Reservations officer. |
| B. J. "Bert" Talbot | European sales dir., Northwest Airlines | Dir. sales development. |
| Arthur S. Best | Ground operations mgr., Latin American Div., Pan American World Airways | Asst. supt. of stations. |
| Thomas L. Lamar | Asst. supt. of stations, Latin American Div., Pan American World Airways | Station mgr., Miami. |
| James I. Zock | Mgr. economic analysis, Trans World Airlines | With American Airlines. |
| Henry O'Neil | Dir. adv., merchandising dept., American Airlines | Mgr. space adv. |
| Meck Howlett | Dir. sales promotion, merchandising dept. American Airlines | Mgr. direct advertising. |
| C. R. Geckie | Sales mgr., North America, for Qantas Empire Airways | Sales supt., Japan, Hong Kong, London and Australia. |
| Lewis C. Sorrell | Dir. transportation program, School of Business Administration, American Univ. | Dir. Research, Air Transport Assn. |
| Larry Glenick | Eastern region pub. rel. mgr., Northwest Airlines | Airline news and pub. rel. work. |

## GOVERNMENT

| | | |
|---|---|---|
| Maj. Gen. Harry P. Storke | Chief of Public Information, Office of Secy. of the Army, and Chief of Information, Office of the Army Chief of Staff | Cmdr. 9th Infantry Div. |
| Edward Margolin | Asst. to Under Secy. of Commerce for Transportation | Program coordinator for Under Secy. |
| Roy E. Moulke | Staff asst. to CAB Member Louis J. Hector | Staff economist, Senate Small Business Committee. |
| Richard J. O'Melia | Spec. asst. to General Counsel of Civil Aeronautics Board | Counsel, Committee on Govt. Operations, U.S. Senate. |

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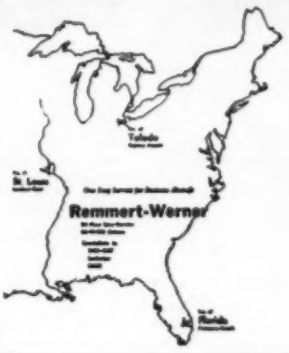


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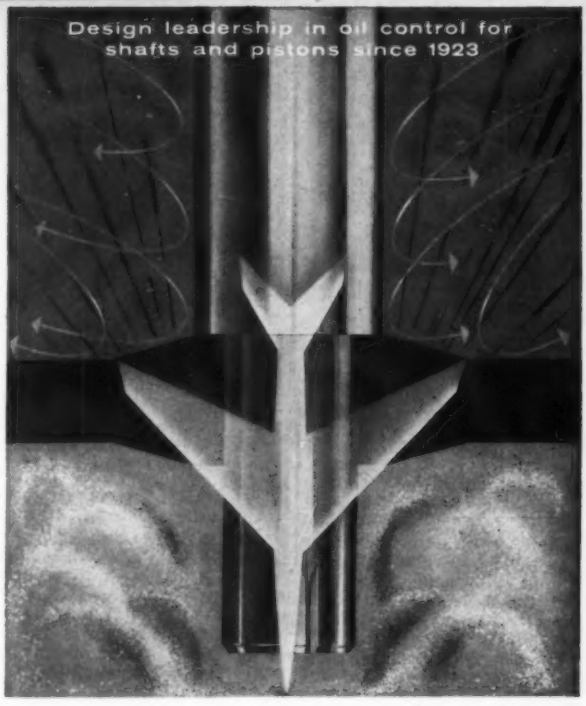


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# EN ROUTE

by Wayne W. Parrish

## Still stuck in Darwin, where beer is big business

WELL, DEAR READERS, we're still in Darwin, Australia. If I got stuck there several days, that's just your hard luck. There was no exit by boat because the next freighter wasn't due for weeks. The nearest railroad was 1,000 miles away and even if I had a car I couldn't travel south because the cyclone had flooded all the roads. So I snagged a seat on Trans-Australia Airline's DC-4 for departure at midnight—next day—and meekly went to the hotel office and asked if they had a room. With bath, if possible, because I felt the need of a little cleansing.

Yes, there was a room with shower right down the hall in the new addition to the hotel. Fine. I took possession of the room, but my bags were still at the airport. So I asked Qantas if the bags could be brought or sent in. Sure, the bloke said. (After three or four calls, the final one late at night and quite desperate, I finally got my bags. Qantas operations are fine but the ground service at Darwin was inexplicably on the short side. Days after leaving Darwin I even discovered there was a senior manager based at Darwin but I never saw or heard about him while there.)

Now about this Hotel Darwin. It was an ideal spot for a hotel. You can grow anything there in the tropics and they could have had a very attractive place looking out over the harbor. It was obvious that the hotel had put forth a big effort to build the room extension, but had done so with zero imagination. They had carpenters making furniture out of fine wood, designed, I heard, by the man down south who had designed the furniture for the Queen's visit. Evidently this was a mark of distinction, but no hotel in its right mind would provide such fine furniture for the public. The rooms were poorly designed. There was no place to put a piece of luggage, for example, except on the newly polished furniture or on the floor. The shower was poorly placed and open on one side with no curtain. There was a steady procession of ants over the only table I could use to put out my belongings and I was one of the room's first occupants.

### Sneaky mosquitoes

Over the bed was a mosquito netting which wouldn't have been necessary if the ceiling fan had been over the bed. But the fan was elsewhere, so the mosquito netting was necessary and that only made the room hotter. Those mosquitoes in Darwin are real sneaky sneaks. Mosquitoes are bad enough anywhere, but these things didn't make any noise and they'd sneak up fast and quietly and bingo, they had you. I fed quite a few of the sneaks while I was there. Specially designed custom-made furniture, but no mosquito bombs. Ah well, values are relative and values are variable from place to place

That night at dinner the very prim, precise gal who ran the dining room—she changed her dress for each meal and was certainly the only well-dressed and pretty female I saw in Darwin—decided to put me at a table of regular diners now that I was no longer a "casual diner" but one of the family. So I ended up at a table for four. One companion turned out to be a Texas-born bloke who had gone to Perth years ago to introduce peanuts to Australia and had done so well that he had started a very big plantation east of Darwin to grow pineapples and other stuff. Having been born a Texan, he had become more Australian than the Aussies and his accent was the most difficult to understand in the entire country.

The other two companions were rough and tough bush country Aussies. They were all quite baffled as to why I should have landed in Darwin on a trip that began by going to Copenhagen to fly over the North Pole. But how could I explain myself to them when I've never been able to explain me to me.

I thought I would splurge in the lounge before dinner so I ordered a scotch and soda. I found out fast that you must say double scotch or you don't get half a thimble full (as in England). I asked for lots of ice but the thin layer of shavings I got on top the glass would disgrace the name of ice. It was pretty awful, so I had a very sober stay in Darwin. Nothing in the way of liquor looked palatable except beer and I don't like beer.

### Beer-drinking serious problem

Speaking of beer, the Texan-born bloke from Perth (every male is a bloke in Australia, no exceptions) told me that Darwin is noted for just two things: civil servants and beer. He said the Northern Territory, in which Darwin is located, is noted for its excess of government workers and its subsidized existence (familiar words to me) and its infinite red tape. (Even the airlines seemed burdened with paper work). As for beer he claimed that the per capita consumption of beer in the Northern Territory of 16,000 persons—that is, man, woman and child—is 67 gallons per year. This seems incredible but not so incredible if you looked into the two saloons in Darwin. All day long and all evening, nothing but beer drinking.

The Australian beer is pretty strong. something like 32 percent, I believe. Beer drinking is a very serious business all over the continent. And the beer industry, I discovered later, has probably done more to hold up progress in Australia than any other influence I know of. The beer boys control the hotels and every hotel is known as a pub and only hotels can sell alcoholic beverages. So the net result is that there is no hotel industry because hotels are only adjuncts to the saloons and the breweries have a cancerous hold on the whole shooting match.

I managed to get some sleep after my bags finally arrived from the airport and next morning I faced a long, long day and a whole evening before departing for Sydney. I did get one favor out of Qantas and that was to send a message to its Sydney office that I had cancelled the Perth trip and to expect me at noon the following day on TAA.

At long last I discovered the one and only store in town that sold newspapers and magazines (I had begun to think that Darwin was illiterate as well as isolated) and a plane came in with some papers from Sydney, so I bought up the lot and got caught up on the news. Much to my amazement I found that I was in quite a storm center and that vast areas had been flooded and that Darwin was isolated except by air.

The more I walked around town the more I recognized a truly cosmopolitan population. The pure Aussies were outnumbered by all sorts of other nationalities. A fair amount of new construction was in progress that in time will re-make the town, which received quite a bit of damage from the Japs back in World War II.

### It could be attractive

Darwin could be quite an attractive tropical spot with a little proper direction and imagination but it is doubtful if the civil servants—who became noticeably numerous the longer I remained there—will ever do much about that. They all seemed so busy on paper work in their offices but what they could be doing with all that paper I wouldn't know. I learned in Sydney that there was a Darwin Club that was quite the place to hang out but as a stranger there I certainly didn't rate and no airline bloke had any ideas about giving me a tip on what to do with my time. So I read a book.

I got some sleep the second night before having to pack and depart from the hotel by bus for the airport for the 1 a. m. takeoff for Sydney. Three times weekly TAA leaves at this unholy hour with a DC-4 and this night there were about 20 hardy passengers for the 2,000-mile hop with one stop at a place up in the bush country called Mount Isa.

The reading lights were good, about the best I've ever seen in a DC-4. The seats were comfortable, but there were no pillows. The ash-trays were the smallest and most useless in the history of air transportation, or perhaps the history of smoking for that matter. I got some sleep but awoke about dawn when we landed at Mount Isa and a lot of women and kids boarded for the still-long hop to Sydney. I began to believe that Australia was as big a country as they said it was.

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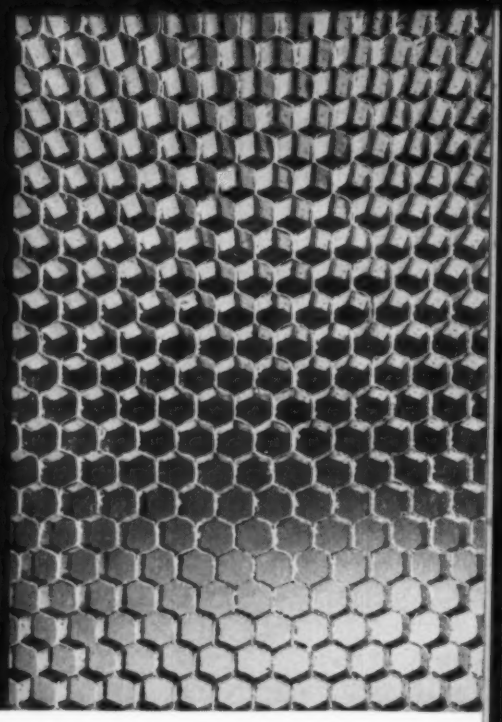

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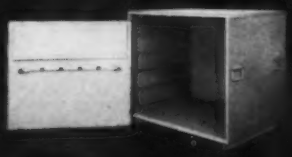

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*Texaco Aircraft Engine Oil* is used by TWA to help make Jetstream the smooth, quiet, above-weather service it is, and to provide TWA aircraft with maximum operating economy and low maintenance costs.

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A Texaco Aviation Representative will give you the facts. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, *Aviation Division,* 135 East 42nd Street, New York 17, N.Y.

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